COMMERCIAL GEOGRAPHY

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COMMERCIAL GEOGRAPHY

BY

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PREFACE

"Can geography be taught so as to make students think?"—Jowett.

THIS question, propounded by the translator of Plato's works, suggests the doubt felt by all who hold the disciplinary or culture theory of education, in regard to the so-called "practical" subjects in the curriculum. The question is one which must be fairly met and answered if these subjects are to be accepted as truly educational in character.

In the case of physical geography, much advance has been made toward a truly scientific, and therefore disciplinary, method of treatment. But in the case of commercial geography, less progress has been made because the nature and scope of the subject have been frequently misapprehended, especially in English-speaking lands.

Commercial geography seems first to have appeared during the 18th century in schools patronized by the trading classes, under the name of Trader's Geography (Kaufmannsgeographie, Handelsgeographie). The subject matter comprised unrelated scraps of information concerning anything and everything "useful for a merchant to know," with special reference, however, to transportation and trade. It was from this class of works that the name commercial geography was borrowed; and by reason of this origin, commercial geography has tended to deal with accomplished facts rather than causes, and with the movement or circulation of goods rather than the fundamental matter of production. Books of this type, lacking a causal or other rational interpretation for their masses of empirical facts, are filled with dollars and bushels and tons in lieu of principles. Clearly, the memorizing of isolated facts and unrelated statistics cannot make students think, nor is it, in any proper sense of the word, educational.

On the other hand, those who have sought to rationalize the subject have as a rule proceeded on the assumption that everything must be explained, if it is to be explained at all, in terms of physical environment. The attempt, however, to explain the immensely complex distribution of industries by one set formula—the influence of environment—results in innumerable forced, artificial explanations which do not really explain. In the end, after the geographical factor has thus been seriously overworked, the usual upshot of the matter is a relapse into the old plan of piling fact upon fact, figure upon figure, without any serious attempt at explanation. The reader familiar with books on commercial geography will readily recall cases in point.

In these circumstances, it becomes necessary to raise the fundamental question: What is commercial geography? What is its purpose, scope, and appropriate method of treatment?

The purpose of commercial geography, as the author conceives it, is to explain, in terms of all the factors involved, the geographic division of labor. More briefly, commercial geography is the study of the localization of industries.

The factors involved are not only nature, but also man and capital goods; for land (or natural resources), labor, and tools or machinery of some sort are indispensable to every kind of production other than that of the bare-handed savage who merely appropriates whatever nature provides. It follows that any variation in the supply, or efficiency, or cost of either labor or capital goods will affect the localization of industries quite as directly as will differences in natural resources or climate. There are consequently three distinct sets of controls—the natural, the human, and the economic—which jointly determine the localization of industries; and commercial geography dare not neglect any one of them on penalty of becoming merely a mass of disconnected facts.

This is true for the reason that while natural resources are due to nature, products are due to man; and the individual man, on whom in the last analysis all production depends,

takes nature into account precisely as he does the factor of labor or capital, that is to say, only in so far as it enables him to produce more goods of a certain kind, or at less cost. It is only as nature thus becomes transmuted into human motives of an economic sort that it effectively controls industry.

Commercial geography, introducing economic considerations and economic modes of reasoning, is consequently the point of contact between the group of sciences dealing with nature and the group dealing with human society; yet it is not a mere mixture of geography and economics. On the contrary, it is a unified scientific discipline so long as it deals with all such facts, and only such facts, as can be shown to have relation to the localization of industry; for unity of purpose and viewpoint constitute the unity of every science.

In view of its purpose, commercial geography has in general no concern with the machinery of exchange, the technique of trade, or industrial processes, unless (as occasionally happens) some of these become factors in the localization of industry. Still less is commercial geography concerned with the description of industries, city by city, which is the proper function of a gazetteer. There is in fact no reason for so much as naming cities in commercial geography except as they illustrate some general principle relating to the localization of industries.

The purpose and scope of the subject in turn indicate the appropriate method of treatment. The control of industries by physical environment is logically first, since it underlies and conditions all others even when, as sometimes happens, other controls have become predominant. For this reason, the scientific treatment of commercial geography must begin with the natural control of industry. For the same reason, after the general or systematic treatment of controls, a regional treatment properly follows. Relief, soil, climate, and natural resources present striking differences in different regions, and only by a regional treatment can these differences be analyzed and their effect appreciated. Finally, there is the

added advantage in a regional treatment that the connection of economic activities with the soil is more obvious, and that the problem of the localization of industries is, therefore, relatively simple and concrete. It follows, therefore, that the intensive regional study of the world, or of some considerable part of it,[1] logically precedes and forms the training for the broader and more complex generalizations involved in the study of the great world industries.

The present work has been written in the belief that the type of commercial geography herein indicated can assuredly be taught "so as to make students think."

The author is indebted to many friends and critics for valuable suggestions: notably to Professor Richard E. Dodge, of Teachers College, New York; Professor T. N. Carver, of Harvard University; Professor Isaiah Bowman, Director and Librarian of the American Geographical Society; Professor M. S. W. Jefferson, of the Michigan State Normal School at Ypsilanti; Professor J. F. Chamberlain, of the State Normal School at Los Angeles; Mr. Wm. B. Guitteau, Supt. of Schools at Toledo, Ohio; Mr. W. N. Ferris, of the Ferris Institute at Big Rapids, Mich.; Mr. Dwight W. Edwards, of the Princeton Mission in Peking; also to Supt. D. Lange, Mr. H. W. Schmidt, Supervisor of Schools, Dr. F. C. Miller, of the Central High School, and Mr. E. N. Bonnell of the John A. Johnson High School, all of St. Paul, Minn. Special thanks are due to Professor C. D. Allin, of the University of Minnesota, who read the proof with great care and made many penetrating criticisms. It goes without saying, however, that the author is solely responsible for the views expressed.

[1]It is worthy of note in this connection that both the Committee of Nine of the National Educational Association, which reported at Los Angeles in 1909, and also the committee of the Association of American Geographers, which reported at the 1909 meeting, expressed strong dissatisfaction with the systematic method even in physical geography. (See *Journal of Geography*, March, 1910.)

NOTE TO EDITION OF 1915

In view of the rapid changes in modern industry, it has seemed desirable to make a thorough revision based on the United States census of 1910 and later statistics, coming down in each case to the latest available year. The same plan has been followed in the sections dealing with other countries.

This has necessitated numerous changes alike in the text, the diagrams, and the maps. On the whole, however, it is a striking fact that nearly all of the generalizations are as applicable today as when first written. This fact conclusively demonstrates that there is a durable content to commercial geography which is but little affected even by the kaleidoscopic changes of modern industry, and in this fact lies its justification as a scholastic discipline.

Thanks are due to various correspondents who have called the author's attention to pertinent facts, and especially to Professor E. Dana Durand, former Director of the United States Census Bureau, who submitted suggestions touching the chapters on the United States, and also read proof on these chapters.

The author, however, assumes full responsibility for all statements and conclusions.

August 2, 1915.

NOTE TO EDITION OF 1923

World relations, both industrial and commercial, have been so vitally affected by the World War as to make necessary a careful revision of the text and the addition of a chapter bearing directly on the far-reaching changes in geography and economics that have taken place in various quarters of the globe. The work of revision has been accomplished through the assistance of widely recognized specialists in these subjects. All information available to date of publication has been utilized, but readjustments are still in progress.

CONTENTS

PAGE

Preface v
List of the Maps xi

PART I. THE GROWTH AND FACTORS OF COMMERCE

I. The Beginnings of Commerce 1
II. The Mediterranean Age of Commerce 7
III. How Commerce Depends on Land and Sea . . . 15
IV. How Commerce Depends on Climate 29
V. How Commerce Depends on Man 39
VI. How Commerce Depends on Economic Forces . . 49
VII. The Development of Transportation 59
VIII. The Principal Raw Materials of Commerce . . 78

PART II. CONTINENTS AND COUNTRIES

IX. The Making of the United States 98
X. The North Atlantic Section 109
XI. The Southern Section 130
XII. The North Central Section 150
XIII. The Western Section 170
XIV. The United States in the Markets of the World . 196
XV. American Expansion in the Pacific 210
XVI. American Expansion in the Caribbean 229
XVII. Canada and Newfoundland 243
XVIII. Middle America and the West Indies . . . 254
XIX. Tropical South America 268
XX. Temperate South America 280
XXI. Oceania and Australasia 291
XXII. Japan and Chosen (Korea) 300
XXIII. The Chinese Republic 310
XXIV. Southern Asia 324
XXV. Western Asia 335
XXVI. Africa 344
XXVII. The Balkan Peninsula and Rumania 360
XXVIII. Other Mediterranean Peninsulas 371
XXIX. Austria, Hungary and Switzerland 381
XXX. France 390
XXXI. Great Britain and Ireland 398
XXXII. The Lesser North Sea Nations 407
XXXIII. Germany 418
XXXIV. Russia and Her Former Possessions 430
XXXV. World Industries and Commerce 440
XXXVI. The World War 456

PART III. APPENDIX

Reference Tables xiii
The Index xxi

LIST OF MAPS

	FIGURE
Ancient and mediæval trade routes to the Orient	3
Mediæval trade routes to the north from the Mediterranean	4
Part of English Harbor, Fanning Island	10
Pago Pago Harbor, Tutuila, Samoa	11
Density of population of the world per square mile	13
Commercial highways of the world	14
Mean annual rainfall and prevailing winds over land and sea	15
Temperature belts of the world	16
Natural vegetation belts of the world	17
Weather map, July 7, 1915	21*a*
Distribution of ocean currents of world	21*b*
Standard time belts in the United States	23
Trolley lines in the Middle West	32
Telegraph, cable, and postal routes	52
North America	53
Physical divisions of the United States	54
Temperature belts in the United States for July and January	56
Mean annual rainfall in the United States	57
The density of population per square mile in the United States	58
Early highways to the West	59
Areas originally wooded and National forest reserves	60
United States	61
Inland water ways of the United States	62
Glacial soils in the United States	63
Fishing banks of the North Atlantic adjacent to North America	65
Distribution of hay and forage crop	66
Long distance transmission of electric power from Niagara Falls	68
Coal fields of the United States	70
Oil and gas fields of the United States	71
Boston Harbor	74
New York Harbor	76
Subways and tunnels, New York, uniting Long Island, Manhattan, and New Jersey	77
Life zones in North America	78
Distribution of tobacco crop	82
Distribution of cotton crop	85
Alabama coal and iron region	92
New Orleans Harbor	93
Yield of all grains per square mile	96
The westward migration of centers of population, agriculture, and manufactures	98
Lake Superior iron and copper districts	99
Stock ranges of the West	105
Irrigated lands in the West	108
Relief map of the Lower Colorado Valley	112
Dry land areas	113
Dry land farming. Districts producing durum wheat	114
Location of principal mineral deposits in the West	116
The early highways to the Pacific	124
Artificial harbor at San Pedro	126

FIGURE

Density of railways in the United States 127
Areas in the United States producing commercial staples 128
Alaska 129
Value of all crops in the United States 133
Value of minerals raised per square mile in the United States 137
Proportional value and density of manufactures by geographic divisions 140
Fisheries and minerals of Alaska 144
The Hawaiian Islands 149
Honolulu and Pearl Harbor 152
Samoa 153
Guam 154
The site of Manila 159
Porto Rico and its dependencies 160
Cuba 164
The Panama Canal 167
Possible hours of sunshine in July 171
Dominion of Canada and Newfoundland 180
South America 181
Mexico 182
Central America and the West Indies 194
Oceania 195
The Philippine Islands 196
Japan 199
Races of man 200
Asia 201
Russia and Siberia 202
China 209
Syria and Mesopotamia 228
The principal languages of commerce 229
Africa in 1922 230
Methods of using the soil 231
Great Britain and Ireland 238
Europe in 1922 239
Density of population of Europe 240
Rainfall of Europe 241
Balkan Peninsula and Rumania 242
Italy 244
The Iberian Peninsula 246
Austria, Hungary, and Czechoslovakia 248
Switzerland 250
France 253
Principal European fishing banks 256
Scandinavian countries 258
The Low Countries 263
Germany and Luxembourg 267
Coal and iron fields of Central Europe 268
Middle Europe 293
The Rhine Frontier 294
Europe in 1923 295
The dismemberment of Austria-Hungary 296
Poland 297
Pre-war Russia and Turkey and the states formed from them 298
Austria-Hungary and its peoples 299

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COMMERCIAL GEOGRAPHY

PART I

THE GROWTH AND FACTORS OF COMMERCE

I—THE BEGINNINGS OF COMMERCE

1. The Origin of Barter. Commerce began in the form of barter. This was at first merely an exchange of gifts; but the idea of getting a bargain, or at least an equivalent value, soon appeared. Men of neighboring tribes, though often at war, would then meet near the boundaries of their tribal territories for barter, much as Northern and Southern pickets "swapped" coffee and tobacco during our Civil War. In the early ages of the world this was everywhere the common method of trade, and it continued in the Pacific islands down to the coming of the first white explorers, who found an exchange of "gifts" generally expected.

The practice of barter lacked, indeed, the excitement of the plundering raids which all tribes had been wont to make into the territories of their neighbors. It had, however, the undeniable advantage that it profited both parties and, incidentally, that no heads were broken. In time it therefore became increasingly prevalent, until finally those favorably situated for trade took it up as a regular business. Such are the trading tribes of Africa, familiar to every reader of Stanley.

2. The Origin of Markets and Fairs. The place where people met for trade became, in time, the market; and this was commonly rendered neutral territory by being put under the protection of the gods, especially such as were venerated by several tribes. Breaches of the peace thus became offenses against the gods. This practice explains the early connection between markets and religious sanctuaries.

Moreover, at points where religious festivals were held, which drew people together from distant regions, periodical markets or fairs commonly developed. Thus Olympia, the seat of the greatest religious festival of ancient Greece, became also an important seat of periodical trade; and at Mecca, during the annual pilgrimage, occurs the greatest fair of the Mohammedan world.

3. Trade among Hunters and Fishers.[1] So long as all members of a tribe lived by the chase, they all had substantially the same kinds of goods, and consequently had little to barter with one another. Moreover, the food supply obtained by hunting was too scanty and uncertain to support many people in any one place. In these circumstances, trade was limited to natural products found only in certain places, such as salt, native metals, stone suitable for tools or weapons, and shells prized for ornaments. These articles were passed from tribe to tribe without the intervention of a special trading class. In this manner jade axes from central Asia early reached western Europe, and copper from the Lake Superior region was widely circulated throughout America before the white man came.

Fishing tribes, on the other hand, having a more constant food supply, settled in compact and relatively permanent villages. A class of expert boat builders arose who received their pay in fish. This was the beginning of division of labor, and consequently of domestic trade. Finally, having learned the secrets of the sea as fishermen, fishing peoples readily developed into seafaring and commercial peoples. Thus the Phœnicians, the most daring sailors and greatest traders of the ancient world, began their career as fishermen.

4. Trade among Shepherds. In the Old World, where animals suitable for domestication most abounded, the tribes of the grass-bearing plains and plateaus had become

[1]This discussion does not mean that there is a fixed order of economic stages through which all civilized peoples have passed. The intention is merely to show the connection between commerce and the predominant mode of livelihood.

shepherds long before the dawn of history. The earliest traditions of the Mediterranean countries consequently reveal a pastoral mode of life, so vividly portrayed in the biblical account of Abraham. Pastoral pursuits still prevail throughout the vast regions in Asia and Africa that lack rainfall sufficient for agriculture, and likewise in the "frozen desert" of the North, where the reindeer has been domesticated.

These ancient shepherd peoples (Fig. 1) around the Mediterranean could have little trade of their own, either domestic

FIG. 1. *Camp of nomadic shepherds in Asia.*

or foreign. They all followed substantially the same mode of life; and they had little surplus for export, because their herds and flocks barely met their own needs. On the other hand, they knew the desert as fishermen know the sea; and, when caravan trade began to develop, their beasts of burden gave them every facility for taking part in it as middlemen. This was especially true of those who had camels, well named "the ships of the desert." (Fig. 2.) For this reason the Arabs, in spite of their plundering proclivities, have always been an important factor in the commerce of western Asia.

5. Trade among Tillers of the Soil. Agriculture—that is, tillage of the soil—first developed in the great alluvial valleys

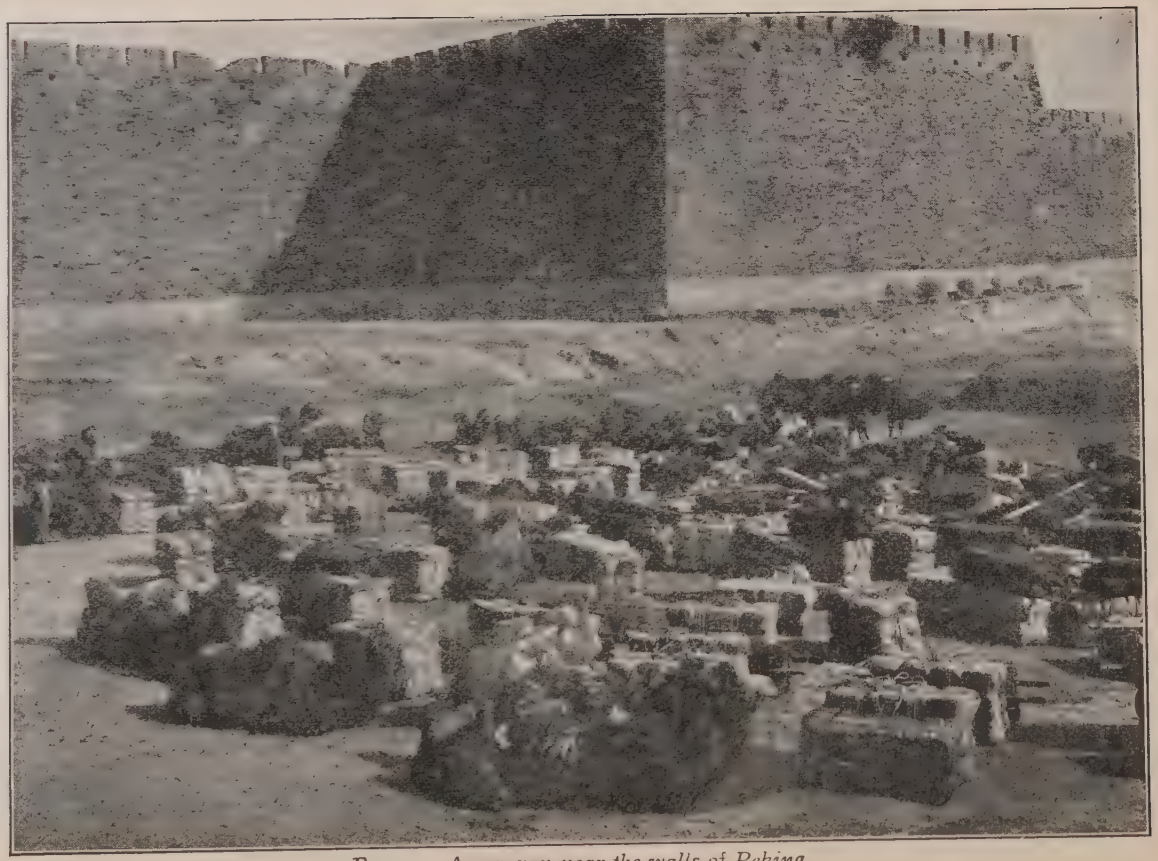


FIG. 2. *A caravan near the walls of Peking.*

of Egypt and Mesopotamia, where the soil was wonderfully fertile, the climate was warm, and some of the seed-bearing grasses, now known as cereals, grew wild. Even among hunting tribes, the women commonly gather some vegetable food; and there is little doubt that the women were the first to till the soil. The men long continued to despise agriculture, though they deeply appreciated its fruits, as was the case with the maize crops raised by the Indian squaws.

This change in the food supply from herds to crops worked a revolution in the conditions of human life. Hunters had of necessity lived from hand to mouth—a feast to-day and a famine to-morrow—without time or thought for the future. Even shepherds had been ever on the move in search of fresh pasturage. Agriculture, however, yielding a large amount of food per acre, could feed a dense and settled population. Tillage of the soil thus made possible for the first time the growth of manufacturing and commercial cities.

At favorable points in these valleys, especially where overland routes crossed the rivers, great cities consequently developed, and their population acquired astonishing skill in hand work of all sorts. Domestic trade flourished, exchanging the products of town and country. Great engineering works were executed, especially for irrigation purposes, which modern engineering skill can hardly surpass. And powerful empires, the first known to history, arose. This was the so-called Fluvial or "Valley" stage of civilization, associated with the Nile, Euphrates, and Tigris rivers. In contrast to it are the later Mediterranean stage, when civilization centered about the Inland (Mediterranean) Sea, and the present Oceanic stage, when civilization reaches out to embrace the world.

6. Egypt and Mesopotamia. The isolation of these valleys, girt about as they were by deserts and mountains, had favored the development of agriculture, for it in a measure hindered invasion. Isolation, however, was not favorable to the growth of foreign commerce. In Egypt, as in China,

it even gave rise to a strong spirit of exclusiveness and to an unreasoning attachment to ancient customs. This spirit threw the foreign trade of Egypt, when it finally did develop, largely into the hands of the Phœnicians and, in later times, the Greeks.[1]

Mesopotamia was far less isolated than Egypt. The Tigris, with its branching valleys, gave access to the North and East; the Euphrates, reaching almost to the headwaters of the Orontes, bound the country even more closely to the West. This region therefore became the meeting place (before 2000 B C.) of the East and the West; and here a great foreign commerce, using money as a medium of exchange, first sprang up. Along the Tigris and Euphrates and the caravan roads running east and west from these rivers, many great commercial cities have flourished in different ages: Nineveh, Babylon, Seleucia,[2] Ctesiphon, Bagdad, on the rivers; Sidon, Tyre, Beirut, and many others on the Mediterranean coast where the caravan routes reached the sea; Damascus, Palmyra, Aleppo, in oases midway between. (Fig. 3.)

Many of these cities are now but mounds of earth amid the unutterable desolation of the Mesopotamian plain, or else lie buried beneath the shifting sands of the desert. The discovery (1498) of the sea route to India, which in the main superseded caravan trade, dealt a heavy blow to this whole region; and its ruin was completed by the Suez Canal (1869). Nevertheless, the natural routes of overland trade remain; and the railways which have been surveyed through Turkey and Persia follow the paths bleached with bones from the countless caravans of ages past.

[1]See Cunningham, *Western Civilization*, vol. i, pp. 14, 16, 24, 44, 45, 54; Day, *History of Commerce*, pp. 9, 10.

[2]Seleucia was the commercial center under the Greeks and Romans (until A. D. 198); Ctesiphon under the New Persian Empire (A. D. 198–635); Bagdad under the Arabs (after 762 A. D.).

II—THE MEDITERRANEAN AGE OF COMMERCE

"Westward the course of empire takes its way."—Bishop Berkeley.

7. The Phœnicians. The Mediterranean Age of Commerce began with the Phœnicians (before 1500 B. C.), who were essentially a seafaring and commercial people—the first, indeed, who dared to "go down to the sea in ships."

They dared it because of necessity. Their home, the narrow coast land of Syria north of Mount Carmel, contained little land fit for tillage, while the giant "Cedars of Lebanon" at their backs furnished timber for shipbuilding. Beginning as fishermen (Sidon means "the Fisher City"), they learned the secret of extracting a valuable dye, the famous "Tyrian purple" from the *Murex*, a kind of shell fish. This discovery gave rise to the weaving and dyeing of textiles. Other industries were also established, especially glass making, for which suitable sands were at hand, and metal working.

Metals exist only in certain places, yet they are indispensable everywhere. The need of metals was therefore the first motive of world commerce. For this reason the Phœnicians early occupied Cyprus, noted for its rich veins of copper. They also settled (about 1100 B. C.) Gades (Cadiz) as an outlet for the silver and lead of Spain. They even brought back the tin of Britain to be smelted at Tyre.

Finally they founded (850 B. C.) the mighty colony of Carthage. For more than five centuries thereafter Carthage was the mistress of the western Mediterranean, waging repeated wars to protect her commercial monopoly against the Greeks and, under Hannibal, even endangering Rome.

8. The Greeks. The successors of the Phœnicians in the commerce of the eastern Mediterranean (about 1000 B. C.) were the Greeks. The nature of their country, at once sterile and abounding in harbors, both turned them from the land and

invited them to the sea. They consequently swarmed forth, at first toward Asia Minor, then toward Africa and the West, till every shore from Massilia (Marseilles) eastward was studded with Greek colonies. When the conquests of Alexander the Great (334-323 B. C.) had settled in their favor the long duel with Persia, Greek cities sprang up as if by magic over all western Asia; and Greek became the general language of commerce, even in Tyre and Sidon. Finally the Romans in the same year (146 B. C.) incorporated Greece in the Roman Empire and destroyed Carthage, thereby opening to Grecian commerce the western Mediterranean.

The principal commercial cities during the days of Greek independence were Corinth and Athens. After Alexander, the center of gravity of the Greek world moved eastward. Rhodes soon superseded Athens as a center of sea-borne commerce; Antioch on the Orontes drew the overland trade from Mesopotamia; and Alexandria became, after the fall of Carthage, the commercial metropolis of the world.

The commercial prosperity of Alexandria, located in a country so isolated by nature as Egypt, was due to artificial means of transportation. A good road was built over an ancient caravan trail from Coptos on the eastward bend of the Nile, below the First Cataract, to Leukos Limen (Kosseir) on the Red Sea, and the canal connecting the Nile with the Red Sea, which Seti I had begun, was opened more than a thousand years later (third century B. C.) by Ptolemy II. This forerunner of the Suez Canal remained in use until A. D. 761. Alexandria, near the mouth of the Nile, consequently became the great distributing point for the sea-borne trade of the Orient. For upstream traffic, the northeast trade winds furnished power, while boats came down stream with the current.

The staple imports of Egypt were silk, spices, pearls and other jewels from the Far East; myrrh and frankincense from Arabia; gold and ivory from East Africa. The goods exported in payment comprised amber and furs derived from northern Europe, also wine, glass, linen, arms, and slaves,

besides much gold and silver. It was thus essentially a commerce in luxuries and as such enormously profitable.

9. The Roman Empire. Rome was an inland city grown great by centuries of conquest. The Romans therefore hated the sea, which ever remained for them *mare dissociable* —the sea that separates—and they despised commerce as the work of slaves. Men and money were the only commodities they deigned to handle. Trade was consequently left in the main to subject peoples—Greeks, Syrians, and Jews. Rome with all its immense population and wealth thus remained a political rather than a commercial center, a city "consuming much and producing little,"[1] supported in the main by the tribute (in grain or money) of the provinces. Only in financial operations did it hold a leading place.

In two respects, however, Rome rendered important services to commerce. The great military highways, radiating from the Golden Milestone in the Roman Forum to the ends of the empire, gave better facilities for overland trade than ever existed elsewhere before the days of railways. And the *Pax Romana*—the Peace of Rome—which long reigned on all the shores of the Mediterranean afforded a security for commerce hitherto unknown.

10. Character of Mediæval Commerce. After the final division of the Roman Empire (A. D. 395), and the fall of the portion ruled from Italy (A. D. 476), western Europe relapsed into barbarism. Wants were consequently few and simple. Every district, even every estate, was expected to be self-supporting. Moreover, there were "sea wolves" and "land wolves" to prey on the luckless merchant. The roads, never being repaired, grew constantly worse for the next thousand years. Commerce was thus forced to follow the rivers; and when the feudal system had split Europe into thousands of petty states, there were toll stations on the rivers every few miles. In these circumstances only the demand of the nobility and clergy for luxuries kept alive a precarious trade.

[1]Cons, *Précis d'Histoire du Commerce*, pp. 59, 64; Day, *History of Commerce*, p. 26.

11. Mediæval Fairs. Such difficulties in transportation made it doubly necessary to fix certain dates when the buyers and sellers of any article, such as furs, could be sure of meeting. This necessity gave rise to annual fairs, like those held at Stourbridge (Cambridge) in England, at Frankfurt and Leipzig in Germany, and at Troyes and other towns in the French province of Champagne.

These fairs, like the fairs of the ancient world, were usually held in connection with some religious festival, which served to bring people together and in a measure to ward off hostile attacks. Fairs formed the chief seats of wholesale trade until increasing density of population and ease of transportation rendered them unnecessary. In the less progressive parts of the world, where the railroad, telegraph, and commercial traveler are little in evidence, fairs still retain their pristine importance. The most important fair in modern Europe is doubtless that of Nijni Novgorod.

Even in advanced commercial countries there are annual agricultural fairs, and occasional international expositions or "World's Fairs," which exercise a marked influence both on education and on commerce.

12. The Levant before the Crusades. The Levant, embracing the lands washed by the eastern Mediterranean, was ruled (after A. D. 330) from Constantinople. This empire, Roman in name, Greek in language, reached the climax of its prosperity and splendor during the ninth and tenth centuries, while western Europe lay buried in squalor and ignorance.

The principal factor in this prosperity was trade with the Orient, especially in silk, which was imported raw, woven into exquisite fabrics at Constantinople or Antioch, and exported again to all parts of the known world. During the early Middle Ages (before A. D. 1000), the bulk of the raw silk came overland, because the sea route from China was long and, for the vessels then in use, extremely dangerous. After the Arab conquest of Egypt (A. D. 640), Constantinople,

commanding all routes to the Far East by way of the Black Sea, succeeded Alexandria as the undisputed commercial capital of the world. (Fig. 3.)

13. Rise of the Italian Cities. After A. D. 1000, a great change began. Larger vessels, possibly also some crude form of the compass, enabled the sea route from China around southern Asia to compete with the overland routes. Constantinople, Bagdad, and the row of caravan cities eastward to Balkh, where the Chinese and Indian roads diverged, at once began to stagnate. Constantinople also suffered from the fact of lying too far east to serve the western markets created by the silver mines of North Central Europe, then newly opened, or to profit by the rising woolen and metal industries of Italy and Flanders (Belgium).

For these reasons the cities of Italy became at first the rivals, then the successors, of Constantinople. The Crusades confirmed their supremacy, bringing them a veritable "commercial boom" through the demand for equipment and for transportation by sea of men and supplies. Venice and Genoa were even able to pull down and set up emperors at Constantinople precisely as the nations of Europe have in recent years striven for mastery at Peking. Venice finally became, after the capture of Constantinople by crusaders in her service (1204), incontestably the leading commercial city in the world.

14. The Commerce of Northern Europe. Since the earliest times, the amber of the Baltic, the tin of Britain, and the furs of the northern forests had found their way along the rivers to the Mediterranean. How important furs were in commerce may be judged from the fact that throughout the Middle Ages the houses of even the nobles and princes entirely lacked heat in winter. Furs were also a staple export to the Orient, being then as now extensively worn by the upper classes in China.

In the later Middle Ages (after 1250), the trade of the North (Fig. 4) fell under the control of the Hanse. This was a

powerful league of some ninety cities, extending from Bruges to Novgorod, with its capital at Lübeck. To the early exports were added fish, hides, silver and copper from the Harz region, and iron from Sweden. The imports were chiefly articles of luxury, above all, silks and spices.

This new commercial realm, centered on the Baltic and North seas, found its chief outlet on the Mediterranean through the port of Venice. Along the roads running north from Venice, just as along the Asian caravan roads, there flourished a series of great commercial cities whose prosperity was builded almost entirely on the oriental commerce that passed through their gates.

15. **The Shifting of Trade Routes.** Ancient and mediæval vessels, being flat bottomed, could sail only with the wind, or else laboriously work their way against it with huge oars. Toward the close of the Middle Ages, however, the keel, invented probably by the Northmen, worked a revolution in navigation hardly less important than has followed the use of steam. By enabling vessels to sail almost into the eye of the wind, the keel made possible for the first time deep-sea, in place of coastwise, navigation.

Early in the fourteenth century, the compass also came into general use in the West. The sea route from Italy to Flanders then began to prevail decisively over the land route. This meant indeed the stagnation of all those cities which had lived on the overland trade. On the other hand, the sea route, touching at Lisbon and the English Channel ports, prepared the way for those nations to enter the commercial arena on their own account. The great emporium for the trade between Italy and the North was for several centuries Bruges; but later (after 1442) Antwerp took the lead because it was accessible to larger vessels and imposed fewer restrictions on foreign traders.

Finally, the conquests of the Turks, fierce nomads from central Asia, who began as hired soldiers of the Caliphs and ended as their masters, blocked up one after another all the

ancient routes to the East. First western Asia (1058), then Constantinople (1453), and lastly Egypt (1520) fell into their hands. In the meantime, this virtual blockade caused the prices of oriental goods in Europe to rise by leaps and bounds, thus offering enormous profits to any one who should find a new and cheaper route to the East. This condition of the market was the impelling motive of the great voyages of discovery which ended the Mediterranean, and introduced the Oceanic Age of Commerce.

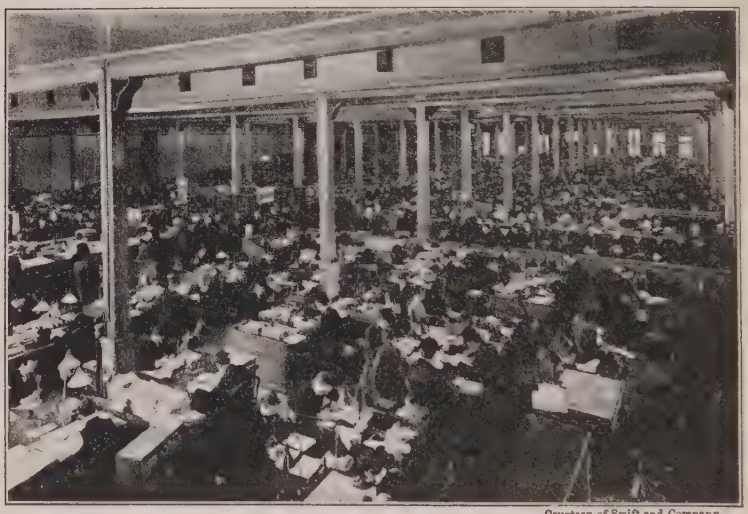
16. The World Faces the Atlantic. When Vasco da Gama reached India by sea (1498), the world changed front in a day. Hitherto it had faced the Mediterranean. On its shores civilization had largely developed. There empires had risen and decayed. There also a succession of great cities, the homes of wealth, learning, and art, had flourished, fed by the never-ceasing stream of commerce between the East and the West. Now for the first time that stream was diverted from its previous course, and forthwith decay fell upon the teeming cities, and silence upon the crowded roads.

The same disaster overtook cities beyond the Alps which had lived on the trade between Italy and the North. Whoever wandered in the streets of picturesque and sleepy Nuremberg after this trade had departed, where the rooks wheeled about the gables that were once, as Longfellow reminds us, the home of art and song, learned in a most impressive manner how cities are made and unmade by the shifting of trade routes.[1]

What the Mediterranean lost the Atlantic gained. It became henceforth the great highway of commerce; in its ports the products of the East and West met for exchange. The commercial supremacy of the world passed to its shores to be contested and successively held by the Portuguese, Spaniards, Dutch, and English.

[1]Could Longfellow revisit Nuremberg to-day he would find it still picturesque, but no longer sleepy. The Suez Canal, the Alpine tunnels, and the railways have made it again the focus of important trade routes.

17. Character of Modern Commerce. With this transfer of commercial supremacy to the Atlantic, the Oceanic Age began. At that time commerce was mainly confined to articles of



Courtesy of Swift and Company

FIG. 5. *Interior of a general office: This suggests something of the vast and complicated organization required to handle the enormous volume of modern commerce.*

luxury used by the few; to-day it supplies the necessities of all. This stupendous revolution has been brought about by the application of the powers of Nature to the processes of manufacture and transportation[1]. The world as we know it to-day is largely the creation of steam and electricity. (Fig. 5.)

[1]During the last two centuries, according to a recent estimate, the foreign commerce of all commercial countries has increased as follows:

Year	Millions of Dollars	Year	Dollars per Capita
1700	125	1800	2.31
1750	250	1840	2.93
1800	1,500	1860	6.01
1900	20,105	1900	13.02
1913	40,420	1913	24.47
1919	75,311	1919	44.28

III—HOW COMMERCE DEPENDS ON LAND AND SEA

"Tell me the geography of a country and I will tell you its future."
—Victor Cousin.

18. What Man Owes to Nature. No man by taking thought can add a cubit to his stature; still less can he make good any great deficiency in the natural resources of his country. Thus he can fish only where there is water, lumber only where there are trees, mine only where there are minerals, devote himself to agriculture, manufactures, or commerce only where natural conditions render these pursuits commercially possible. For the greater part of what he enjoys man thus remains directly or indirectly the pensioner of Nature. Most justly, therefore, and with profound insight into the relation of man and the earth, did the Greeks speak of "Mother Earth."

19. Factors in the Natural Control of Industry and Commerce. All aspects of Nature doubtless react upon man to some extent. The factors however which affect most directly his mode of livelihood are: the character of the soil; the topography or surface features of the earth; the coast line; the climate; and the natural resources, notably fish, forests, grasslands, minerals, and water power.

20. Civilization Based on the Soil. The soil is the foundation of all permanent prosperity. Unless the soil be reasonably fertile, agriculture is impossible; and without agriculture there can be no enduring civilization and therefore no extensive commerce. Gold populated California and built cities as if by magic; but wheat and fruit have long since become the basis of California's prosperity. As with mining, so with lumbering; the forests once cut away, the lumber camps and towns are deserted, and the country relapses into wilderness until such time as a new forest shall have grown to merchantable size, unless the soil be fit for farming.

21. The Kinds of Soil. The soil comes in the main from rocks which have crumbled to pieces through long exposure to the weather.

As to its physical character, soil varies by almost imperceptible gradations from coarse gravel to fine clay. For practical purposes, however, it is usually classified as sandy, loamy, or clayey.[1]

A sandy soil consists for the most part of relatively large, rounded particles, usually derived from very hard rocks. It is "light" or easily worked; and it is "warm" or readily heated by the sun in the spring, for which reason a sandy soil is well suited to early vegetables. It is, however, so porous that it does not hold rainfall well; and it is comparatively poor in accessible plant food.

A loamy soil is intermediate in character, containing both sand and clay in fairly equal proportions.

A clay soil consists in the main of very fine particles, derived usually from shale or other soft rocks. Not being so porous as sand it holds water well, which is an advantage in dry regions or seasons. A clay soil is "heavy" or hard to work, and is "cold" or slow to warm up in the spring; but it is the most fertile, and the most lasting in its fertility, of all types of soil. The regions which form the world's granaries and those which support the densest population by agriculture have largely clay soils.

22. Organic Matter in Soil. Finally, the soil depends for its fertility not only on its physical character and mineral constituents, but also to perhaps an equal degree on the organic matter which it contains. Undecayed organic matter (peat) is indeed a hindrance to tillage; but decayed or decaying vegetation (humus) renders the soil more open and porous, so that air and water can more easily reach the roots, and it greatly increases the available plant food. It is largely owing to vegetable humus in the soil that districts recently covered by deciduous forests, and likewise prairies

[1]King, *The Soil*, p. 100.

where the grasses have flourished and decayed for ages, are for a time so very fertile when brought under the plow.

23. Formation and Transportation of Soil. As to its method of formation, soil is either residual or transported. Residual soil was formed on the spot from the decay of the rocks lying directly beneath, and of course varies in character with those rocks. South of the Ohio, for example, where most of the soil is residual, it is much more fertile over limestone than over sandstone.

In many parts of the world the soil has been transported far from its place of origin by running water, by glaciers, or by the winds. The lower valleys of great rivers, for instance, are commonly covered with alluvial soil, deposited by the rivers at flood time. Other vast areas, like most of America north of the Ohio River, have glacial soils, deposited in former ages by melting glaciers. Still other districts have loess, or wind-borne soil. For example, the loess beds of northern China, thousands of feet thick, were brought by the prevailing west winds of winter from the arid uplands of central Asia and deposited where a moister climate was encountered. These transported soils, though differing greatly from one another in fertility, are alike in that they usually contain fragments of many kinds of rock, and are therefore less quickly exhausted by tillage than are the residual soils.

24. How Lowlands Affect Agriculture. The "everlasting hills" are not in fact everlasting; for every rain and every stream carries a load of soil from the highlands toward the lowlands, lowering the one and filling up the other. Even the cloud-capped mountains would eventually be worn down almost to sea level if the mountain-building forces should cease their work.

Lowlands, being thus supplied with fine soil at the expense of the uplands, are the principal sources of the world's food supply. For this reason more than three-fourths of all the people in the world live at elevations of less than 1,000 feet. The most productive and most densely-peopled agricultural

regions are naturally the deltas and valleys of great rivers like the Nile and Ganges, which constantly bring down fresh soil. Within the Tropics, however, fertile river valleys are frequently so unhealthful as to be very sparsely peopled. This is the condition of the Amazon Valley. (Fig. 13.)

25. How Lowlands Affect Transportation and Commerce. Lowland rivers, having considerable volume and a slight fall, usually afford cheap transportation, and they can frequently be connected by canals. The level surface also favors railroad construction, unless too low or too level for good drainage. In districts subject to overflow, however, the roads and even the railways keep to the ridges, as in parts of the Red River Valley, where the beaches of former Lake Agassiz form natural driveways.

Owing to their fertility, dense agricultural population, and cheap transportation facilities, lowlands are also the principal seats of manufactures and of commerce.

26. How High Plains Affect Commerce. High plains or plateaus are frequently edged by mountains so that the winds are drained of moisture before reaching the plateaus. In such cases they are suited for grazing rather than agriculture, like the Great Basin west of the Rockies, and contribute to commerce chiefly wool, hides, and other animal products. But plateaus which are fairly well watered, like those in tropical America, sometimes support a dense agricultural population.

Being relatively level, high plains hinder transportation only if difficult of access from the lowlands, or if intersected by a profound gorge like the Grand Cañon of the Colorado. If too wide to bridge, such a gorge is in fact impassable for commerce, and may compel a detour of hundreds of miles.

As a rule transportation routes follow valleys which offer the easiest grades. But if a plateau has been deeply cut into by rivers, roads and railways sometimes follow the divides between the rivers, since these retain the generally level surface of the original plateau. The Allegheny Plateau affords many illustrations of this principle, notably in eastern Kentucky.

27. How Upland Valleys Affect Agriculture and Transportation. Broad valleys and valley basins between parallel mountain ranges, being covered in large part with fine soil washed from higher levels, are fertile, and therefore well peopled. Excellent examples are the "parks" of Colorado. Even richer in soil are the beds of former lakes, like the basin surrounding Great Salt Lake, where the finest and most fertile particles of soil that were washed from the surrounding uplands were deposited.

FIG. 6. *How rivers prepare the way for railways—Royal Gorge, Grand Cañon of the Arkansas.*

Valleys that cut across mountain ranges furnish the usual routes of railways (Fig. 6), which follow one stream to its head and another stream down the opposite slope, crossing the intervening divide by tunnel or at the lowest pass. Like islands containing harbors in mid-ocean, such mountain passes are individually important in proportion as they are far apart.

Where a river cuts through a mountain range, the valley usually contracts to a narrow water gap; and since all trade

and travel up or down the valley is here brought to a focus, a water gap is apt to be marked by a town or city. A good example is Harpers Ferry, located where the Potomac makes its way through the Blue Ridge. Sometimes after cutting a water gap, a river is somehow diverted from its course leaving what is called a "wind gap." Such was the origin of many passes famous in history, like Cumberland Gap between Virginia and Kentucky. (Fig. 59.)

28. How Mountains Affect Agriculture and Transportation. Broken plateaus and mountain slopes are adapted to forests or grazing, rather than to agriculture. The soil is thin and poor at best, and if loosened by the plow, it is speedily swept away by the rains. Moreover, machinery cannot be used to advantage on small or rough fields, nor can crops be readily marketed. Farmers in such a region consequently live a wretched life of poverty and ignorance from generation to generation, retaining ideas, tools, and methods long since abandoned in the plains. On the other hand, mountain-born rivers in traversing arid regions, like those adjacent to the Rockies, furnish water to irrigate large tracts of land in their valleys.

Mountains which serve as watersheds determine the course of rivers and river valleys, and therefore, in great measure, of commerce. Mountains, moreover, usually lack navigable water ways and good wagon roads. They even exact a heavy tribute from railroads in the shape of expensive bridges, rock cuts, tunnels, snowsheds, constant repairs, extra engines and fuel, and light train loads. Man is far from having conquered the mountains for purposes of transportation, as he has conquered the plains and the sea.

29. Relation of Mountains to Mining and Manufactures. Mountain streams, fed by snows and rains upon the higher levels and descending with rapid current, usually furnish abundant water power.

Again, mountains are frequently the seat of mining. Here are found the best building materials, such as granite, slate, and marble. Here also the ancient crystalline rocks, deeply

buried elsewhere, have been brought to light by upheaval and the erosion of running water. It is in such rocks that the ores of gold, silver, copper, and other metals usually occur. Furthermore, the best grades of coal are, as a rule, found in or near the mountains, because the heat and pressure generated by mountain building have driven off the volatile parts of the coal, leaving a large proportion of fixed carbon.

By reason of water power, metals, and mineral fuels, manufacturing cities not infrequently develop at the foot of mountains. Thus Birmingham, Ala., owes its existence to the vast stores of coal and iron in the adjacent hills. (Fig. 92.)

30. How Mountains Affect Climate. Finally, lofty mountains force the air passing over them to ascend and become

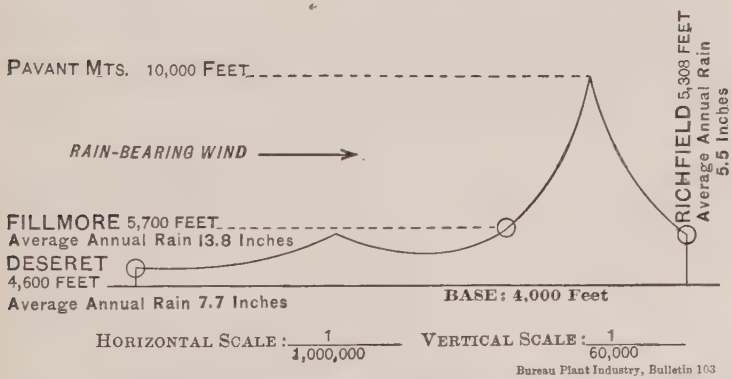


FIG. 7. *Profile sketch showing relation of mountains to rainfall in Utah.*

chilled, thus causing rainfall on the side toward the prevailing winds, but an arid region on the opposite side. (Fig. 7.) They also break somewhat the force of the winds, whether warm or cold. Mountains thus control in great measure the climate, and therefore the industries, of the neighboring plains for hundreds or even thousands of miles. So it is with the Sierra Nevada and Cascade ranges.

31. Relation of Forests to Man. The forest primeval ranks almost with the mountains in its effect on man, on his mode of livelihood, and consequently on commerce.

To the early settlers in America, the forest seemed merely a hiding place for wild beasts and hostile Indians. To fell the forests and let in the light therefore came to be regarded as a conquest achieved over a common enemy of man and of civilization. Something of this feeling still persists on the frontier and the pioneer in forested regions still swings his ax with vindictive force, though the forest, so far from being the enemy, has long since been recognized as the best friend of man. Nevertheless, so rapid and so thorough has been the work of destruction that the day is now at hand in this country when the last of the mighty forests prepared by Nature through a thousand years will have disappeared.

32. How Forests Affect Soil, Water Power, and Navigation. Forests not only enrich the soil through decaying vegetation, but they also protect it from rapid erosion. What is perhaps still more important, the mat of forest vegetation, both above and below ground, serves as a sponge to absorb and hold the rain and melting snow. The water consequently sinks into the earth and issues gradually in springs, in place of rushing at once into the rivers. In this way, forests equalize the flow of rivers, moderating both floods and droughts and conserving the rivers for purposes of irrigation, water power, and navigation during all seasons of the year.

How important these services are may be judged from the results of deforestation, especially in the hilly parts of the South, where the ground is not protected by frost from the heavy rains of winter. (Fig. 8.) One may see there from the car window thousands upon thousands of acres already stripped of soil by the rains and turned into "bad lands," as useless to man for all time to come as though sunk beneath the sea.[1] Moreover, the valleys, wherever the forests have been cut away, are increasingly ravaged by floods; while water powers, estimated at over a million horse power and worth $20,000,000 a year, are endangered.[2] In order to check

[1]Shaler, in U. S. Geological Survey, *Report, 1891*, vol. iv, pt. 1, p. 332.
[2]United States Forest Service, *Circulars*, 143, 144.

such destruction, Congress has finally provided for the purchase and permanent reforestation of the most rugged districts both in the southern Appalachians and in New England. (Fig. 60.)

33. **How Forests Affect the Climate.** Again, a forested land is cooler in summer and warmer in winter than a treeless surface. As a result of this fact great forests, sheltering the soil from the burning heat of summer and the biting winds of winter, have something of the same effect as the ocean in moderating extremes of climate.[1] Moreover, a forested surface, cooled by constant evaporation, is a better condenser

Courtesy of Department of Agriculture

FIG. 8. *Hillside ruined by erosion, where the forest had been cut away.*

of moisture, and therefore less liable to prolonged drought, than a surface of bare rocks or of sun-baked soil.

34. **Economic Importance of Forestry.** Finally, forests are as necessary to civilization as grain fields; and, considering the quality of land suitable for forests, they can be made as profitable. Cheap lumber has been a potent factor in the rapid development of the United States, especially the western prairies; and a timber famine, such as now impends, must needs lay a crushing tax on American industry and commerce.

It is therefore imperative that a scientific system of forestry be followed in lumbering, whereby the young trees may

[1]Forest Service, *Bulletin 7, Forest Influences.*

be saved to perpetuate the forest, wherever the soil is too stony or sandy or the slope is too steep for farming. In fact, millions of acres of the uplands in the United States, now denuded of timber, would best serve the uses of man if permanently reforested. Already the proportion of forested area in the United States has fallen almost as low as in Germany. (Fig. 9.)

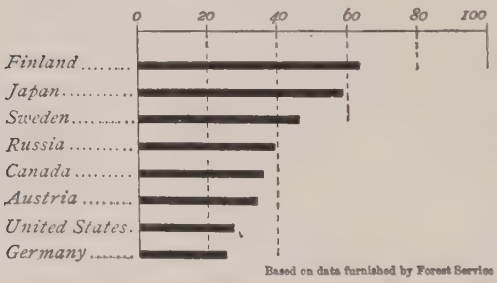


FIG. 9. *Per cent of area forested in chief timber-producing countries.*

35. How Coast Lines Affect Commerce. It is said that there is no place in Greece more than fifty miles, and no place in England more than seventy miles, from the sea. This fact goes far to explain why Greece was the first part of Europe to become civilized, and why England ranks so high in the world's commerce. Europe as a whole is likewise greatly indented by arms of the sea, giving it a much longer coast line in proportion to its size, and helping to give it a much larger commerce, than any other continent. At the other extreme stands Africa, still the "Dark Continent" in large part because the coast line is singularly unbroken, which has hindered the access of civilizing influences from over sea.

The accessibility of the land from the sea affects commerce perhaps even more than the extent of coast line. Harborless coasts as a rule have little share in commerce. By reason of easy access to the sea, islands have often played a part in history and in commerce out of all proportion to their size. The Grecian Islands, Great Britain, and Japan are examples.

36. The Formation of Harbors. The continents, which seem so firm, are in fact in a state of very unstable equilibrium, now rising slowly through centuries and again sinking. A coast which has sunk considerably in recent geological

time is favorable to commerce, because the lower valleys are drowned beneath the sea. This is the origin of most important inlets such as Chesapeake Bay and Puget Sound. Conversely, an uplifted coast is unfavorable to commerce, because it lacks such inlets, and is often bordered by dangerous shoals.

FIG. 10. *Part of English Harbor, Fanning Island.*

Some rocky coasts, like Maine and Alaska, are pierced by fiord harbors, that is, valleys eroded deep below the water line by former glaciers. But such harbors are often backed by rugged and unproductive country, which cannot support a large commerce. This condition is illustrated by Norway.

On many coasts barrier harbors occur, sheltered by small islands, as at Boston (Fig. 74); or sand bars, as at Galveston; or coral reefs, as in the Bermudas. An atoll harbor consists of such a reef partly inclosing a lagoon, as in Fanning Island (Fig. 10), now a station on the cable from Canada to Australia.

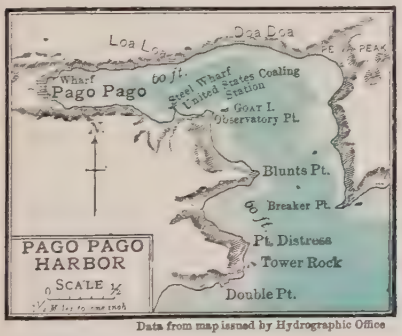


FIG. 11. *Pago Pago Harbor, Tutuila, Samoa.*

On volcanic coasts are sometimes found crater harbors, formed by the sea breaking into an extinct volcano. Perhaps the finest example in the world is Pago Pago Harbor (Fig. 11) in American Samoa.

Where natural harbors

are lacking or inadequate and the water is not too deep, artificial harbors may be formed, at great cost, by erecting breakwaters, as has been done at San Pedro, Cal. (Fig. 126.) Even the best natural harbors are in part artificial since they require more or less improvement to fit them for the immense vessels now in use.

37. How Location Affects Commerce. Napoleon once declared war to be "a matter of positions." In commerce, as in war, success depends largely on the positions held by the contending parties. It was the favorable location of Venice

FIG 12. *Where land and water transportation meet. Bird's-eye view of the Reading Terminals at Philadelphia.*

and the Netherlands, backed by the splendid energy and daring of their people, which made them for many generations the leading commercial nations of the world.

The seats of commerce are located at places clearly designated by nature—"at the crossroads of the great world thoroughfares."

38. The Termini of Ocean Routes. Such crossroads are found in a preëminent sense, wherever ocean and land transportation meet; that is, where goods brought by sea are landed and those brought by land are transferred to ships. The great

markets of the world are therefore seaports, located either at the head of ocean navigation on rivers, as London, Montreal, Philadelphia (Fig. 12), Baltimore, New Orleans, or else at the head of bays having good connections inland, as Boston, New York, San Francisco, and Buenos Aires.

Important seaports, serving as entrepôts, or distributing points, are likewise found wherever many lines of ocean transportation meet; for many goods are there landed and transhipped. Hong Kong and Singapore are good examples. Such entrepôts also arise where a narrow isthmus separates important bodies of water (Corinth, Panama).

39. The Termini of Inland Water Routes. Commercial cities likewise arise away from the seacoast wherever land and water transportation meet. This occurs near the heads of great lakes, as at Duluth–Superior, and Chicago. It occurs also at the head of river navigation (Trenton, St. Paul); where several rivers and river valleys converge (St. Louis, Pittsburgh); near falls or rapids which impede navigation (Louisville); at the bridge nearest the mouth of a great river (Memphis); and where a great bend occurs in an important river or river valley (Cincinnati, Kansas City).

What a vital part water transportation plays in commerce may be judged from the fact that of the twenty largest cities in the United States, eight are on the coast, five on the Great Lakes, six on the Mississippi, the Missouri, and the Ohio, and one on the Potomac.

40. The Crossing of Land Routes. Finally, important cities are also created by the meeting of several lines of land transportation, that is, of caravan routes or railways. Such centers of population are fixed, not less than harbor and river cities, by the surface of the country. They are either in the center of extensive plains, where the lines of trade and travel from all directions cross (Indianapolis), or they stand at the focus of radiating mountain passes. This sort of location, which built Vienna, Turin, and Milan, is equally responsible for Atlanta and Denver.

41. Typical Military, Naval, and Commercial Sites. In contrast, therefore, to military cities, which were perched upon hills (Athens, Rome), the chief seats of commerce are found in the lowlands. Moreover in contrast to naval ports, which are located by preference at the extremities of peninsulas so as to have the longest radius of action by sea, commercial ports lie at the inner ends of bays so as to shorten the more expensive transportation by land. Brest in France, Pola in Italy, and the Dry Tortugas near Key West in Florida, are thus typical locations for naval ports; precisely as Havre, Trieste, and Mobile are for commercial ports.

42. The Paths of Ocean Commerce. The ocean can, indeed, be navigated in any direction, while a train must follow the rails. This is one great advantage of ocean transportation. Nevertheless there are certain routes, connecting the principal commercial countries, which are always thronged with vessels, while other parts of the ocean seldom see a sail. (Fig. 14.)

Ocean trade routes rarely follow a straight line. Even steamships shape their course more or less by the winds and currents (Fig. 21*b*) since they may gain or lose fifty miles a day in this way. Again, the fogs and icebergs of the North Atlantic force vessels to follow a southerly course part of the year. Finally, projecting capes such as São Roque, Good Hope, and Horn modify all routes in their vicinity, while isthmuses such as Suez and Panama, unless cut through by man, would cause a detour of thousands of miles. Ocean trade routes are also controlled in a positive way by the location of much-frequented channels or ship canals connecting different seas; above all by the English and Florida channels, the Strait of Malacca, the Suez Canal, the Dardanelles, the Strait of Gibraltar, and the Panama Canal.

Thus the barriers which limit commerce to-day are not water barriers, as in the ages before man had mastered navigation, but land barriers.

IV—HOW COMMERCE DEPENDS ON CLIMATE

43. Climate. Even more than soil, surface, or coast line, climate controls the industry and commerce of nations. In fact, it limits absolutely all natural products except minerals. And nothing shakes the commercial world to its foundations like a series of crop failures, due to unfavorable climatic conditions, such as prevailed in the West before the panic of 1983.

Climate is simply the average of weather conditions; and its elements are heat, light, moisture, and wind. These factors taken together make up all the climatic differences between Alaska and the Sahara.

44. Why It Rains. Nothing in nature is more impressive than the dependence of human occupations on moisture. The most arid desert, as a rule, lacks nothing but rainfall to make it blossom as the rose; and the most fertile farm land would speedily lapse into desert were the rain to cease. The causes which produce or hinder rainfall are therefore potent influences in the commerce of the world. (Fig. 15.)

It is a fact (or law) of nature that warm air can hold more moisture than cold air.[1] In general, therefore, anything which chills the air considerably will tend to cause rain or snow. Conversely, air absorbs more moisture as it grows warmer. The conditions are thus favorable for rainfall: (1) when the air rises, as in passing over mountains or in approaching the centers of low atmospheric pressure[2] which travel from west to east in the Temperate zones; (2) when it blows from the sea toward a cooler land, as on the western coast of Europe in winter; (3) when it blows away from the equator, as in the region of prevailing southwesterly winds north of latitude 40° N.

[1] Salisbury, *Physiography*, Advanced Course, p. 569.

[2] See one of the maps issued by the Weather Bureau.

On the other hand, drought is produced by a pronounced current of air moving: (1) toward the equator, as in the trade-wind belt (Sahara); (2) from higher to lower levels, like the Chinook wind which, descending from the Rocky Mountains, evaporates the heaviest snowfall almost over night; (3) from a colder sea toward a warmer land, as in parts of southwest Africa washed by a cold ocean current.

The west coasts in Temperate zones, the east coasts in the Tropics, receive the prevailing winds fresh from the sea, the principal source of moisture. They are consequently as a rule the best-watered parts of the continents.

45. Causes Affecting Heat and Light. Heat is necessary for life; without it there could be no commerce. If need be, parts of a country can be irrigated; but no country can be artificially heated.

The temperature of a region depends on several factors, the most important being its latitude or distance from the equator. (Fig. 16.) Latitude affects the temperature not because the sun is materially nearer at the equator, but because, as you go away from the equator, the rays of the sun strike less perpendicularly. The same explanation holds for the greater heat of summer, and likewise for the fact that hillsides facing the sun are somewhat warmer than level lands. It is for this reason that vineyards are found as a rule on the southern slope in Europe, but on the northern slope in Australia.

The second factor is altitude or elevation above sea level. Its effect may be thus roughly expressed:

320 feet elevation = 1 degree of latitude = 1 degree F.[1]

A climb up a mountain side in the Tropics to snow line would thus carry one through the same temperature and vegetation belts as a journey from the equator to the Arctic region—a fact of vital import for the future of the white race in the Tropics.

The third factor affecting temperature is the sea, which changes its temperature much more slowly than the land

[1]Hann, *Climatology*. The data are 100 meters = 0.57° C., or 328.08 feet = 1.026° F. Also 50° latitude in the Northern Hemisphere = 50.94° F.; in Southern = 49.86° F.

and consequently moderates extremes both of heat and cold. Moreover, the ocean currents and the prevailing winds carry the heat of the regions whence they come far away into other lands. Thus Great Britain, surrounded by the sea, has an oceanic climate, neither very hot nor very cold; and the west winds, warmed by passing over a current (or rather a slow drift) of water from the Tropics, spread the influence of the Atlantic over all western Europe.[1] On the other hand, eastern Russia has a continental climate, marked by great extremes of heat and cold.

Besides heat, light is necessary for the ripening of crops. Thus grain will not ripen in the Falkland Islands, which are not excessively cold, because the sky there is nearly always cloudy.

Finally, the nearer to the poles, the longer are the days in summer, and the many hours of continuous sunshine (twenty or more in the higher latitudes) force vegetation to an extraordinarily rapid growth. (Figs. 17 and 171.) To this fact is due the extension of the grain belt far toward the poles.

46. The Relation of the Wind to Commerce. From the foregoing discussion it appears that the active agent in the distribution of moisture and heat is everywhere the wind. The wind system of the world is thus a factor of commanding importance in all industries that depend, directly or indirectly, on climate.

Persistent winds blowing over the ocean moreover cause a drift of surface water in the same direction, which in some places develops into strong currents. Both winds and currents, in addition to their climatic effects, materially influence ocean navigation, even in these days of steam.

Sailing vessels, of course, depend absolutely on the winds and will always follow a longer course with favoring winds rather than a shorter course with adverse winds. Thus ships sailing from England to Australia commonly go out by way of the Cape of Good Hope, but return by way of Cape Horn, in

[1] Shaler, *Nature and Man*, p. 143; Salisbury, *Physiography*, p. 700.

order to take advantage of the strong west wind below latitude 40° S. The trade winds are perhaps even more available for navigation than the west winds, because less variable.

47. The Cause of the Wind. The cause of the wind is the unequal weight of the air in different parts of the world. (Fig. 18.) The force of gravity does the rest, promptly setting the heavier air in motion toward the areas of lighter air. These are known as "areas of low pressure."

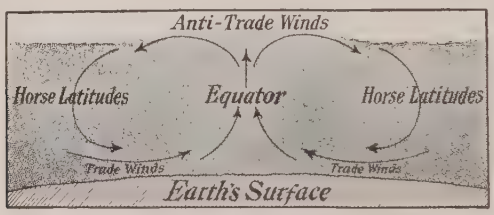


FIG. 18. *The cause of the trade winds.*

The principal cause of this inequality in the weight of the air is the greater heat of the sun near the equator, which expands the air in the equatorial belt and thus makes it lighter. Another cause is the rotation of the earth, which tends to throw the air toward the equator, and thus by compression to make it heavier in that region. The joint effect of these two opposing forces is a belt of low pressure near the equator, and a belt or "ridge" of high atmospheric pressure at about 30°—35° each side of the equator. From this belt of permanent high pressure in each hemisphere, known as the Horse Latitudes, the air moves toward the equator and also in opposite direction toward the poles, just as a spring on a water parting sends its waters down both slopes. The winds blowing toward the equator are the two trade winds, the winds blowing toward the poles are the prevailing westerlies of the Temperate zones—all being turned from a direct north and south course by the rotation of the earth.[1] (Fig. 19.)

48. Prevailing Winds and Climatic Belts. Although the unequal heating of land and sea and the effect of ocean currents and of mountains, cause great climatic differences, even in the same latitude, it is still possible to define belts of

[1]Salisbury, *Physiography*, chs. 16, 17.

similar winds and climate roughly parallel to the equator. The limits of all the wind and climatic belts shift north and south about 5° to 10° of latitude with the sun. (Fig. 20.)

Going from the equator toward the pole, we find in each hemisphere six climatic belts or zones: the Equatorial, Subequatorial, Tropical, Subtropical, Temperate, and Frigid.

49. The Equatorial Zone. Near the equator, within the permanent belt of low atmospheric pressure, the warm air is always rising, much as it does over a heated stove, but more slowly. (Fig. 18.) As a result there is very little surface wind, and the rising air, becoming chilled, drops part of its moisture in heavy rains. As the sun is vertical twice a year, once in the spring and again in the autumn, and each time strengthens this up-draft of heated air, there are two rainy seasons—or rather, two seasons more rainy than the rest—and two relatively dry seasons. This is the case, for example, at Panama. This belt of calms and rains, extending 5° to 10° each side of the equator, is known to sailors as the *doldrums*.

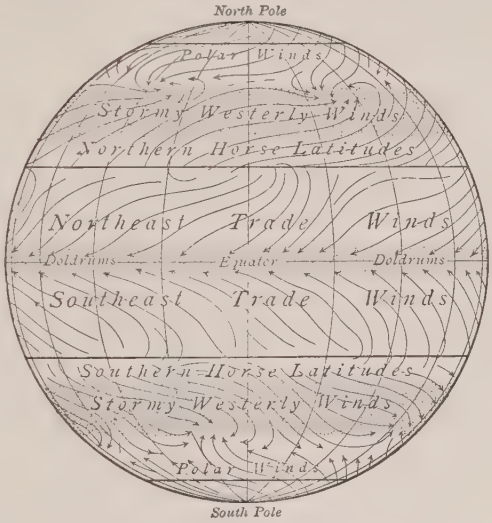


FIG. 19. *The prevailing surface winds of the world.*

Owing to the heavy rainfall, most of the belt is densely forested, and produces for export chiefly jungle products, such as rubber, mahogany, dye woods, besides ivory from certain jungle animals. The one important cultivated crop is cocoa. The soil is usually fertile, but the combination of constant heat

and humidity is debilitating; food sufficient to sustain life may be had for the picking, and clothes are not necessary to existence. There is consequently little incentive to labor, and the natives have as a rule remained naked savages. Such conditions are well illustrated in the Amazon and Congo valleys.

The mountains and elevated plateaus in this belt have of course quite a different type of climate and population, and yield different products, such as coffee, tea, and even wheat.

50. The Subequatorial Zones. Bordering the Equatorial zone in each hemisphere is a transition belt extending from 10° to perhaps 20° from the equator, where the two rainy seasons coming close together in summer merge into one, while in winter the drying trade wind blows. This is the Subequatorial or Savanna zone, abounding in grass lands, but treeless except where there are slopes steep enough to condense moisture from the trade wind. It is consequently the chief stock-raising zone within the Tropics. Examples are the llanos of Venezuela, the campos of Brazil, the grasslands of Rhodesia, and of the Sudân in Africa. These grasslands bordering the equatorial forests do not cease abruptly but (in Africa, for example) pass gradually into deserts about latitude 18° to 20°.

FIG. 20. *Seasonal migration of winds and climatic belts of world.*

51. The Tropical Zones. The Tropical or trade-wind belt extends from the outer (or poleward) limit of the doldrums to perhaps 30° from the equator.

The trade winds, formed by the heavier air pressing toward the equator, blow from the northeast in the Northern,

from the southeast in the Southern Hemisphere; and since they move toward a warmer region, they tend to create deserts in level regions such as the Sahara, Arabia, and central Australia. On the other hand when chilled by rising over elevated coasts or mountains, they yield rain in torrents, as on the east coast of Central America.

The level and therefore arid portions of the trade-wind belts play little part in commerce, being sparsely occupied by nomad shepherd tribes, though the desert oases do contribute dates for export. The humid portions, on the other hand, produce the bulk of the commercial staples peculiar to the Tropics, especially cane sugar and coffee.

In many parts of the world, the unequal heating of sea and land causes the air to move toward the land in summer and toward the sea in winter. These monsoon winds find their greatest development in southern and eastern Asia, where, owing to the intense heat in the interior of the continent during the summer, the northeast trade wind is diverted from its usual course, or even entirely overpowered, and the heavier air over the oceans rushes from all directions toward the interior of Asia. To this summer monsoon wind are due the abundant rainfall, the productivity, and the dense population of India, the Philippines, and southern China, which lie in the latitude of the Sahara. (Figs. 15 and 17.)

This monsoon region produces most of the rice, tea, silk, jute, Manila hemp, and not a little of the cotton of the world.

52. The Subtropical Zones. Along the poleward edge of either trade-wind belt in the Horse Latitudes the currents of air which ascend at the equator again reach the surface of the earth, producing another belt of calms, or light and variable winds. (Fig. 18.) This is the Subtropical zone. Its location is in general about latitude 30° to 35°, though in Europe it extends north in summer to latitude 40°, or even 45° in southern France.

These zones receive some rain in winter from the westerly wind, which then reaches farthest toward the equator, but

in summer come under the influence of the drying trade wind, which then begins farthest from the equator. Moreover the descending air currents, growing warmer as they descend, tend to produce drought. The Subtropical zones are therefore in the main semi-arid, especially in summer when irrigation is often necessary, and they contain patches of true desert. Southern California, Arizona, and the Mediterranean region are familiar examples. (Fig. 21.) This type of climate is most clearly marked on the western side of the continents, while toward the east it is interrupted by summer rains of monsoon or cyclonic origin, notably in Asia and North America.

FIG. 21. *Grove of date palms, Biskra, Algeria.*

Commercially, the Subtropical zone is important chiefly through its production of southern fruits and nuts—especially grapes, figs, olives, almonds, oranges, and lemons—for most of which it is no doubt the original home. In the regions of summer rains, however, especially in the United States, the staple crops are cotton and tobacco.

53. The Temperate Zones. The air current moving from the Horse Latitudes toward the pole blows from the southwest in the Northern, from the northwest in the Southern Hemisphere. This is the "Brave West Wind" of sailors, which is

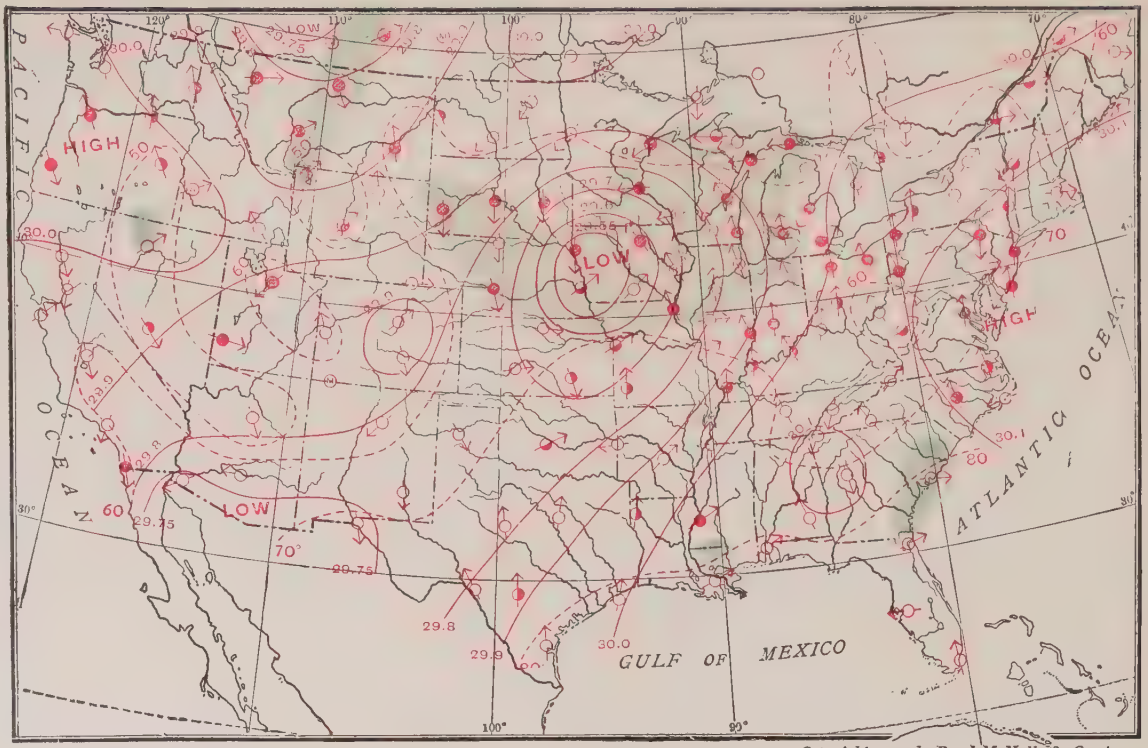


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FIG. 21 *a*. *Weather map, July 7, 1915.* After U. S. Weather Bureau

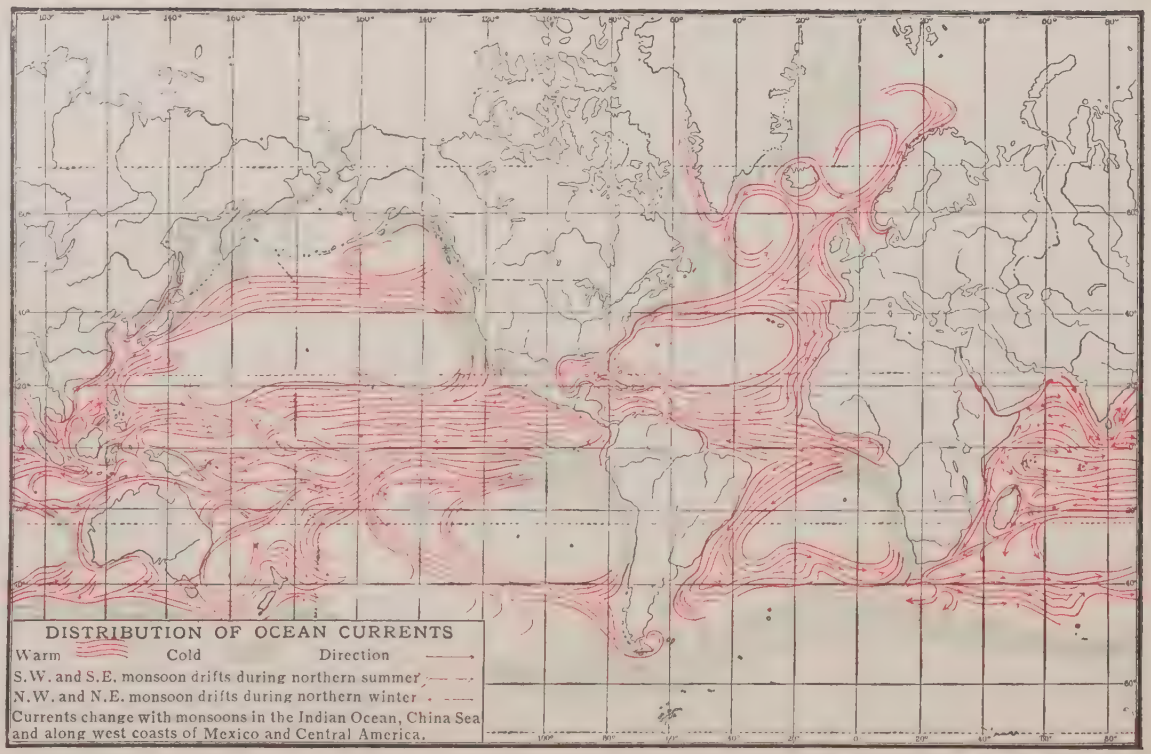

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FIG. 21*b*. *Distribution of the ocean currents of the world.*

strongest in the "Roaring Forties" of the Southern Hemisphere, where there is little land to obstruct its course. It is usually rain-bearing, except when descending from higher to lower levels on mountain sides, or when traversing plains as warm as the air. The rainfall in these zones is naturally heaviest on the western coasts and on the western slopes of mountains exposed to the west winds. (Fig. 7.)

The distribution of moisture is also profoundly affected by the great whirling storms, a thousand miles or more in diameter (cyclones, but not tornadoes) which, in the Temperate zones, surround temporary areas of low pressure as they move from west to east around the world. The warm moist air from the oceans, blowing toward these areas of low pressure, penetrates thousands of miles into the interior of the continents. (Fig. 21*a*.) Largely through the influence of these cyclonic storms the Temperate zones are well watered, except where lofty mountains intervene. (Fig. 15.) Examples are the greater part of the United States, Canada, northern Europe, and Asia.

Measured by temperature, the limits of the Temperate zones are very irregular, as they extend from about latitude 35° to latitude 50° on the east coasts and to 60° (in places even 70°) on the west coasts of the continents, where the west winds from the oceans moderate the winters. Perhaps the most satisfactory poleward limit is the line of 50° F. for the warmest month, that being the heat necessary to maintain forests and ripen hardy crops. (Fig. 16.)

Commercially, the Temperate zones are most important for the production of breadstuffs and live stock. They are also the seat of the leading mining, manufacturing, and commercial nations.

54. The Frigid Zones. In the Frigid zones where the soil is always frozen, except a few inches on top, and where darkness prevails throughout a considerable part of the year, the sea rather than the soil is the source of food and the most severe effort produces barely enough to sustain life, leaving no surplus for the higher uses of man. These regions therefore

contribute almost nothing to commerce, and their inhabitants have never of their own efforts risen above savagery.

55. The Relation of Climate to Man. The climate largely determines men's occupations, food, and dress. It also in a measure stimulates or checks their emotions, directs their thoughts, and subtly moulds their whole constitution and temperament. Tropical peoples are more impetuous, but less tenacious of purpose and far less energetic in labor, than those of colder zones. For this reason no ruling race has ever had its seat within the Tropics, at least in the moist regions, nor has any civilized nation ever arisen there, except such as dwelt at considerable elevations above sea level. There is, however, a sharp distinction between the natives of humid regions in the Tropics and the desert dwellers, who have ever been more energetic and independent, as witness the Arabs.

In the Temperate zones, on th other hand, the changes of the seasons are favorable to activity and energy; and the gifts of nature, being neither altogether lacking nor yet superabundant, at once encourage and compel man to supplement nature through his own efforts. A temperate climate is thus the most favorable for the development of man. Civilization, indeed, may be defined as a by-product (or incidental result) of the effort necessary to sustain life.

Moreover, within the North Temperate zone, the seat of power has shifted far toward the north since the dawn of history. From Egypt and Babylon, located just outside the Tropics, the scepter of dominion passed successively to Persia, Greece, and Rome; when Rome fell, her heritage went to the peoples beyond the Alps. To-day there is no great nation whose capital is much nearer the equator than 40°; London is north of 50°; and Washington is about 39° North.

The temperate zones originate three-fourths of the world's commerce; and the leadership of the world, in industry, commerce, and politics, rests with peoples reared under an inclement sky and schooled to severe labor for their daily bread.

Tuesday.

V—HOW COMMERCE DEPENDS ON MAN

"Oh, East is East, and West is West, and never the twain shall meet."
—Kipling.

56. The Relation of Man to Commerce. The basis of commerce is unlikeness of products in different regions, which must consequently exchange their products in order to satisfy their wants. This condition constitutes geographic division of labor, which it is the business of commercial geography to study and explain.

Unlikeness of products may be due to difference in natural resources or to difference in the wants and the productive efficiency of different peoples. The wants of men are the motive power behind all industry and commerce. For this reason, to civilize a savage, the first and most indispensable step is to give him wants. The native of the Tropics, and the savage everywhere, having few wants, cannot be depended on for regular labor. But let the savage once learn to crave new kinds of food or clothes or anything else which he can only secure by labor and he becomes forthwith a laborer. The efficiency of men as producers consequently varies greatly; and this variation is reflected in the existing economic conditions throughout the world. England and the Sudân, for example, differ not less in the character of their inhabitants than they do in natural resources.

Such difference in wants and productive efficiency may result from either the inherited and more or less involuntary characteristics of various peoples, associated with difference in race, religion, custom, language, and nationality; or it may result from their voluntary and purposeful activities, such as the services of government, the system of taxation, commercial policies, and the regulation of weights and measures, money, banks, and education.

57. The Influence of Race. Since the dawn of history some 6,000 years ago, the white, yellow, and black races have been fixed types; and the white race has always been most largely represented in commerce. It would therefore be a waste of time to discuss the business condition or prospects of such countries as Haiti or China without regard to the well ascertained traits of their inhabitants. (Fig. 200.)

The chief branches of the white race have in like manner become more or less distinct. A Hebrew is usually unmistakable, while certain common qualities distinguish the Latin, Teutonic, and Slavic nations from one another. These common qualities, however they originated, control commerce quite as directly as does physical environment. Racial difference assuredly has much to do with the startling contrast, in commerce as in other respects, between the Portuguese in Brazil and the English-speaking population of North America.

58. The Influence of Religion. The direct influence of religion upon industry and commerce is far from insignificant. For example, the Jew may not eat pork, nor the Brahman beef; the Catholic is limited to fish on certain fast days; and the Mohammedan is forbidden to use alcoholic liquors. These and other religious rules, such as the numerous holidays required by some religions, affect in important respects the industry and commerce of extensive regions.

The indirect influence of religion, while subtle and difficult to state, is still more far reaching. Thus the stagnation of China for the last thousand years was certainly due in part to Confucianism, the state religion, which exalted the wise men of old so greatly that every innovation appeared a mortal sin. "Whatever has not been, must not be," is the Confucian creed. Again, the decay of the Mohammedan peoples cannot be explained without reference to their fatalism. "Nothing happens but by the will of Allah; why then disturb one's self?" So the Turk reasons; and logically enough he will hardly bestir himself to throw on water if his house catches fire. Still less, of course, will he bestir himself to labor. If riches come

to him, it is well; if not, it is also well. However restful such a creed may appear in this strenuous age and country, it is clearly not favorable to industry or commerce.

59. The Influence of Custom and Morality. Peoples long isolated from others are not infrequently hostile to foreigners and to everything of foreign origin. In the interior of China, for example, travelers were sometimes driven to adopt the native garb, even to the "pig tails" (long braids of hair) in order to escape insult and possible injury. The same hostility limits the sales of foreign goods, and leads at times to organized boycotts against them. In like manner, the peons (laborers) in Mexico and Central America refuse to use, and they sometimes destroy, modern tools and farm machinery, preferring their wooden hoes and plows. Such a disposition opposes great obstacles to commercial development.

Again, since trade was at first a substitute for war (§1), a man went down into the market place bent on getting the better of the foreigner, whom he continued to regard as his enemy[1]. Substantially this conception of trade has survived to the present day in most parts of Asia and Africa, where time is not money, where the aim is to make a large profit on a few sales, and cheating seems to be entirely according to the rules of the game. The same method is also pursued in many cases by the huckster and peddler (to say nothing of the horse trader) the world over.

On the other hand, the method of small profits but large sales is increasingly characteristic of western civilization; and when carried to its logical conclusion, it means full weight and measure, one price for all, and the sale of goods strictly on their merits Moreover, since business has come to be transacted so largely on credit, it rests almost entirely on mutual confidence between man and man. Without confidence, indeed, modern business would be impossible. For this reason, business morality must be reckoned at least as essential to success in commerce as intelligence, or skill of hand, or ample resources.

[1]The Latin word *hostis* means both "foreigner" and "enemy."

60. The Influence of Language. Difference of language is a hindrance to commercial as to social intercourse, imposing as it does the necessity of maintaining a class of interpreters able to use several languages. (Fig. 229.) In this respect, western Europe is less favorably circumstanced for commerce to-day than in the Middle Ages, when Latin was the common language of business, as it was of literature and government.

In the hope of overcoming this barrier of language, artificial languages such as *Esperanto* have been invented; but a true world language will doubtless come, if it comes at all, by the spread and modification of some existing language. Many believe that English would stand the best chance of universal acceptance if only its spelling could be completely reformed.

The leading languages of commerce, measured by extent of territory, include: English in the widely scattered British Empire and the United States; Spanish, throughout most of America south of the Rio Grande; Russian, prevalent over nearly half of Europe and of Asia; Chinese, spoken by a fourth of the human race in eastern Asia; and Arabic, current in the native marts from western Africa to central Asia.

In addition, there are two curious mongrel dialects of some commercial importance: *Lingua Franca*, a mixture of French, Italian, and Arabic, spoken in the eastern Mediterranean ports; and *Pidgin English* (Business English) a mixture of English and Chinese, commonly used in the ports of the western Pacific.

61. The Influence of Nationality. The modern conception of nationality is, in brief, that a man belongs to the nation for which, in case of necessity, he must bear arms. Nevertheless, behind this tie of military allegiance there are commonly other and stronger bonds of union, such as community of language, interests, and ideals. In default of such bonds, the mere obligation of military service tends to lose its force. Austria-Hungary, with its warring races and languages, was a case in point.

Moreover, the type of man which predominates in a nation determines its attitude toward industry and trade.

What this type shall be depends not alone on the soil, climate, and natural resources of the country, but also on its history. Thus commerce, held in the highest honor by Phœnicians, was by the Romans esteemed the work of slaves. In like manner, the seven hundred years' war of the Spaniards against the Moors, followed by the Spanish discovery and conquest of the New World, made the object of their desire wealth obtained by conquest rather than by industry or commerce.

62. The Services of Government. Unless the government be able and willing to protect life and property, and especially unless the courts be honest and courageous, a fatal blight falls upon the land. Men will not work, still less will they save, without reasonable prospect of enjoying the fruit of their labors. This explains in large part the poverty of tropical South America, where the governments sometimes vie with the revolutionists in robbing the people, and the courts often represent merely the will of the dictator of the hour.

In addition to protection, the government sometimes renders direct aid to commerce: for example, in the care of rivers and harbors; the building of lighthouses, life-saving stations, roads, bridges, wharves, docks, and canals; the preservation of fish and forests; the reclamation of waste lands by irrigation and drainage; the publication of geological maps, sailing charts, consular reports, weather and agricultural bulletins; the establishment of colonies; and the protection of commerce across the sea. These governmental aids to industry and commerce have assumed great importance in recent years, even in the United States, as shown by the forest reserves, and the comprehensive plans for irrigation, drainage, and the conservation of natural resources.

Finally, there is an increasing tendency for governments to go into business on their own account, sometimes as a source of revenue, more often to insure the people better and cheaper service. In this country the government operates the postal system, while many cities have their own water and lighting plants. In Europe this tendency has gone much further.

Most of the states there own the telegraph lines and the railways; some of them have even established government monopolies in salt, tobacco, opium, gasoline, and alcoholic liquors.

63. The System of Taxation. To support the government in the task of maintaining order and giving aid to commerce, taxation is indispensable. This touches industry and trade at a thousand points. A tax system such as Philip II once tried to impose on the Netherlands (a tax on every sale of every article) would soon ruin the most flourishing country; while on the other hand a country may prosper under a heavy burden of taxation, provided it be laid on all citizens in proportion to their several tax-paying abilities.

64. The Effect of Commercial Policies. In modern times taxes on imports have been used by nearly all nations as a weapon of commercial warfare to build up certain of their own industries, supposedly at the expense of competing nations.

Some countries grant direct bounties to encourage certain industries, as Canada has done for the manufacture of pig iron; many pay subsidies to their merchant shipping either openly, or indirectly, as by excessive payments for the carriage of mails or exemption from canal or harbor dues.

The wisdom of this whole protective system is indeed denied by many, who affirm that in the long run free trade would be more advantageous for all nations. Nevertheless protection still remains the general policy of most countries, and has the support of a considerable party even in England, the principal free-trade country of Europe. "Customs lines are an expression of the struggle for existence as it stands at the beginning of the twentieth century."

65. Weights, Measures, and Grading. If business is to be transacted with certainty and dispatch, it is essential that there be common units of weight and measure. With the growth of international trade, it has become increasingly desirable that these units be common to all the nations. For this reason the metric system, invented in France, has been accepted by most civilized nations except those speaking

English. This system, being based on ten and multiples thereof, facilitates reckoning. On the other hand, English and American firms doing an export business are at a disadvantage because pounds and feet are entirely unfamiliar to their foreign customers. (Table 2.)

Of perhaps equal importance is the system of government inspection and grading of staple commodities such as wheat. It at once insures the purchaser against fraud, and it makes possible the storage (Fig. 22) and shipment of the commodity in car-load or ship-load lots. The system of grading and

FIG. 22. *The modern type of elevator in use at Minneapolis. The grain is stored in separate steel or concrete tanks as a protection against fire.*

handling in bulk has contributed hardly less than improvements in railways and steamships to cheapen transportation and to extend commerce.

Another step in the same direction was signalized by the United States Food and Drugs Act, extending government inspection and certification to foods and drugs, so as to protect the consumer against adulteration. The tendency of such legislation is to inspire greater confidence in American products abroad and thereby to create a better market for them.

66. Time Belts. Since time is marked by the sun, a place farther east has naturally a different time from one farther west. To avoid the confusion caused by frequent changes of time, the railroads some years ago agreed to divide North America into five time belts, each having a time exactly an hour earlier than the belt next toward the west. Railroad or standard time has now come into general use by the public. A similar plan has also been adopted in Europe. (Fig. 23.)

As dawn travels in an unbroken course from east to west around the world, it is necessary, in order to avoid confusion

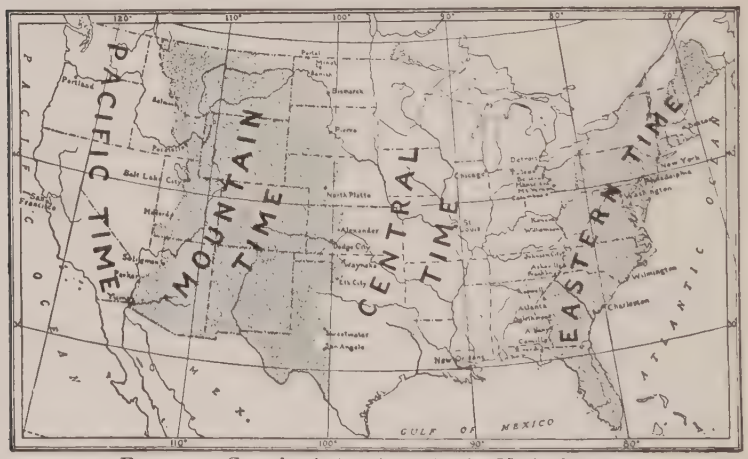


FIG. 23. *Standard time belts in the United States.*

as to dates, to fix an International Date Line where each day shall begin. This line follows in the main the 180th meridian west of Greenwich, England. When it is Sunday noon at Greenwich, Monday is just beginning at the International Date Line. (Fig. 14.)

67. The Machinery of Exchange. Long before any organized government existed, the inconveniences of barter caused people to use as a measure of value and a medium of exchange some commodity, such as cattle, silver, or gold, which nearly every one desired. Any commodity so used was money.

Money was thus not created by government, but its regulation is now one of the most important functions of the government in all civilized countries. If the money fluctuates in value, as paper money did in the United States during the Civil War, no man can tell whether he will gain or lose by any transaction; consequently confidence is destroyed and commerce stagnates. At the present time, all important countries except China base their money on gold; that is to say, silver and paper money are made redeemable in gold.

Equally essential to prosperity is a sound banking system. If banks are lacking, or if they do not command general confidence, the people will hide their money, which is thus withdrawn from circulation. The result is that men who need to borrow money must pay an exorbitant rate of interest, and commerce again stagnates. Moreover, certain banks (Federal Reserve Banks in the United States) issue bank notes which circulate as money; while checks and drafts also, in effect, take the place of money in the payment of debts.

Finally, banks settle accounts against one another through institutions known as clearing houses, where credits offset debits and only the differences or balances are paid in money. Essentially the same result is reached in the settlement of international trade balances by the use of foreign exchange or orders-to-pay, drawn by merchants in one country against their debtors in other countries. In the settlement of international trade balances, London is virtually the clearing house for the world.

68. The Bearing of Education on Commerce. Prior to the industrial revolution inaugurated by steam and continued by electricity, most industries were carried on by hand; and the knowledge of the practical arts was handed down from generation to generation by the apprentice system. In the last century, however, since the rise of science and the victorious advance of power machinery into nearly all the fields formerly occupied by hand labor, the apprentice system has all but disappeared in the principal industrial countries.

In like manner, markets were local in the old days, when nearly all industries were neighborhood industries. In such circumstances, the ability to read and write and figure sufficed for the transaction of business; but the division of labor and the development of transportation have separated ever farther producers and consumers and thrust between them the whole immense machinery of modern commerce. Moreover, the expense of marketing goods is an integral part of the expense of producing them. Inefficiency in commerce thus tends just as effectually as inefficiency in production to increase the cost, limit the output, and lower the quality of goods.

It follows, therefore, that while the old method of training for industry and commerce has broken down, the necessity for wide information and trained judgment is greater to-day than ever before.

In view of these facts, all the leading nations have at last awakened to the necessity for a thorough technical education. Knowledge is power no less among nations than among men; and just as the untrained man cannot compete with the trained athlete, so the uneducated nation is helpless against the educated nation. In this age of machinery and specialization, therefore, that country which, having the necessary natural resources, educates most effectively for agriculture, manufactures, and commerce will inevitably become master of the world's markets. To such education, more than to any other single factor, was due the extraordinarily rapid rise of Germany as a commercial nation; but German ambition was directed toward political as well as commercial domination.

VI—HOW COMMERCE DEPENDS ON ECONOMIC FORCES

69. The Nature of Economic Development. The Greeks fabled that Athena, the goddess of wisdom, sprang full-armed from the head of Zeus; and the Egyptians traced every practical art to some special deity. But we know that skill of hand and knowledge of natural laws have been slowly acquired through the ages, each generation adding a little to the precious heritage, until civilized man has now chained many of the forces of nature to his chariot.

However complex this process of economic development may be in its details, it is singularly simple in its main features.

The savage, like the beast of the forest, is dependent for his food upon what nature spontaneously provides. Civilization, in the economic sense, is merely an organized attempt to increase and supplement the free gifts of nature, using for this purpose the materials and forces available in nature. If food and clothes and everything else needed by men were supplied by nature as abundantly as the air we breathe—if, in short, as Kingsley fabled, plum puddings grew on trees and geese flew about already roasted—there would be no need for labor, and there would consequently be no such thing as civilization.

In order to supplement the gifts of nature most effectively, civilized man has hit upon the division of labor. It is an old proverb that "a jack of all trades is master of none." On the other hand, a man who confines himself to one line of work naturally becomes more skillful in it. Moreover, some parts of the world are especially fitted, by climate or natural resources, for certain industries. Finally, by means of commerce the surplus products of all classes of workers and all parts of the world are exchanged, thus giving to each the benefit of the skill and natural resources of all.

The essence of economic development is thus: (1) increasing division of labor, between classes and between countries; and (2) increasing development of commerce, both internal and foreign.

70. Geographic Division of Labor. So far as transportation facilities permit, each industry tends to become localized: (1) where soil and climate are the most suitable; (2) where raw materials and coal, or water power, are the most abundant; (3) where the largest markets are easiest of access; (4) where there is already at hand a supply of labor skilled in that particular industry.

It rarely happens that one district combines all of these favoring conditions. Not infrequently, indeed, an industry once firmly rooted will hold its own with surprising tenacity long after all the conditions which at first favored its development in that locality have passed away; for there remain capital already invested in that industry which cannot be readily turned to other uses, business experience, business prestige, and a supply of skilled labor. This fact serves to explain many of the seeming anomalies of economic geography, such as the persistence of metal industries in New England after iron ore had practically ceased being smelted in that section.

71. The Principle of Maximum Returns. The four factors controlling the localization of industries (§70), reduce, in practice, to one—the principle of maximum returns.

Resources are due to nature, but products are due to man: or rather, they are due to individual men, each seeking to make for himself the best possible livelihood. Nature thus controls industry only in so far as it enters into the economic calculations of individuals, by rendering one industry more profitable than another in any given locality. Moreover, it is not enough that one industry yield more per acre than another; it must yield more per man. If a farmer can, with the same labor, grow ten acres of sugar beets at a profit of $50.00 per acre, or one hundred acres of corn at a profit

of $10.00 an acre, he will assuredly plant his land to corn, provided he has land enough. The principle of maximum returns to the proprietor of the business is consequently decisive as to what industries shall be developed.

It is indeed customary and convenient to speak of what the "United States" produces, or exports, or imports. In point of fact, however, industry and commerce are carried on, not by nations, but by individuals; and it is merely the sum total of private production and trade which we call the national production and trade.

This pursuit of personal interest sometimes degenerates into the desire to get something for nothing, as in "bargain hunting," or into the craze to get rich quickly. But it happens that, to a considerable extent, the interests of the individual and of society coincide. In order to secure the maximum profit a man must (except in case of monopolies) so direct his labor as to produce the most goods at the least cost; and this, viewed from the standpoint of society, amounts to supplementing most effectively the free gifts of nature.

72. **Maximum Returns from Land.** Where land is practically free (as it was on the American frontier a generation ago), the farmer aims to spread his labor over as much land as possible, so long as he thereby increases his crops in the aggregate. This system of extensive farming, still exemplified by wheat raising in the Northwest, yields little to the acre, but much to the man and the team. So long as population is scanty and land is cheap, this is consequently the most profitable system of farming.

As population grows denser and the land acquires value, however, more intensive farming (that is, the use of more labor and capital on a given amount of land) becomes necessary to secure the maximum profit. After this has been carried to a certain point, it involves the introduction of other crops, such as sugar beets, fruit, tobacco, or garden truck, that call for more labor but yield larger returns per acre than wheat or other staple crops.

This economic principle of maximum returns often clashes with and overrides purely geographical considerations. It is evident, for example, that the rising value of land, due to the introduction of other crops, may force wheat into a subordinate place in the crop system of the very districts best adapted to it by nature—as occurred in the Genesee Valley—or may exclude it altogether from such districts, if the land can be used more profitably in other ways.

The same principle applies to city property. Cheap land usually has cheap buildings upon it; while the most valuable sites in the business district are occupied by the finest office buildings, for only such buildings can pay a reasonable return on the price of the land.

73. **Maximum Returns from Capital.** Robinson Crusoe, though cast upon a desert island, had at his disposal the resources of civilization, represented by the spoils from the wrecked ship. Without such resources, he must have made a sorry failure in his attempt to wrest a living from nature.

As this illustration shows, capital in the form of tools and other instruments of production is indispensable to effective labor. The problem for the farmer, as for the factory manager, is so to combine capital and labor, together with the proper amount of land, as to secure the maximum returns.

Many operations, such as reaping grain or making shoes, may be performed either by hand labor or by machinery. In each case the cheaper method will naturally be adopted. As a general thing, hand labor is cheap in old and densely-peopled countries, but dear in new countries; for which reason new countries, such as the United States, make extensive use of machinery.

Extensive use of machinery, in turn, generally favors large-scale production. A large farm, like a large factory, can more profitably use expensive machinery. Large-scale production in turn tends to localize the industries where machinery can best be used. Thus the bonanza wheat farms of the Northwest and of the Pacific slope have been made possible

by the perfection of planting and harvesting machinery.

74. Maximum Returns from Labor. The cost of labor is measured not so much by the wages paid as by the efficiency of the laborer. As a matter of fact, highly paid labor is usually the cheapest. Thus skilled laborers in the United States as a rule turn out more goods for every dollar of wages they receive than do laborers in countries where they get only ten to twenty cents a day.

There are, however, some industries requiring much hand-labor, which are poverty-industries, carried on only where there is a large population, a low standard of living, and consequently a low rate of wages. Examples are the production of raw silk, tea, flax fiber, and, in the United States, of ready-made clothing. (§494, §498.)

Moreover, the maximum returns both for the individual and for society are attained when the ablest manager is in control of the most efficient capital goods and the most fertile or best located land. For this reason an able farmer is seldom found on poor land, or using worn-out machinery; while on the other hand a tumble-down farm and a tumble-down farmer usually go together.

Further, labor like machinery must be steadily employed if it is to yield the maximum returns. This principle is of special importance in agriculture, since a farmer who grows only one crop, such as wheat, may be idle the larger part of the year. This is a clear economic waste. As a general thing, a farmer will therefore secure the maximum returns if he plants several crops which demand his attention at different times of the year. For this reason, crops are often grown far beyond their natural geographical limits, like oats in the South, if they happen not to require attention at the same season as the principal crop of the section.

75. Complementary Industries. On the basis of the season when they call for labor, the principal field crops of the United States have been divided[1] into three non-competing groups:

[1]Taylor, *Agricultural Economics.*

the winter grains, sown in the fall; the spring small grains; and the crops requiring cultivation early in the growing season (inter-tilled crops) such as cotton, tobacco, corn, sugar beets and other root crops. To these may be added as non-competing industries the raising of poultry and live stock for the market, since these require attention mostly in the winter; while dairy cattle, if more in number than the women and children can care for, usually take the attention of the men away from the crops at all seasons. For this reason, stock raising for the market is often a side industry; while dairying tends, wherever established (unless in the form of winter dairying) to supersede the production of crops for the market.

Again, the principle of maximum returns for labor often leads to the establishment of complementary manufacturing industries. Examples are the silk and other textile mills (employing chiefly women) near iron and steel mills (employing only strong men) in eastern Pennsylvania, in the Rhine and Ruhr basins of Europe, and elsewhere. Such textile mills are due to the presence of unemployed labor rather than to geographical conditions.

Further, there is a most intimate relation between the several industries, so that the development or decline of one usually affects a number of others. Thus the growth of intensive or scientific farming in Europe created a demand for fertilizers, which has given rise to an immense nitrate trade with Chile; and this trade, giving low rates on return cargoes, has in turn favored European exports to South America.

76. The Influence of Substitution. There are few articles in use for which some substitute, more or less imperfect of course, cannot be found. For example, wheat bread is more palatable than rye bread; but whenever wheat is scarce and expensive, rye is largely substituted for it, thus advancing somewhat the price of rye and checking the violent rise in the price of wheat which would otherwise occur.

Again, whenever a new and cheaper article is permanently substituted for one previously in use, it gives rise to a new

industry, which more or less supplants an old industry. In most cases this involves changes in the geographic division of labor, and consequently in the direction of commerce. Thus petroleum has largely taken the place, for lighting and lubricating purposes, of whale oil. This substitution has almost driven whaling fleets from the ocean. So also cotton-seed oil, a by-product of cotton ginning, competes sharply with cocoanut and olive oil; butterine and oleomargarine, made from animal fats and cotton-seed oil, compete with butter; and beet sugar competes with cane sugar.

Perhaps the most far-reaching substitution on record was that of cotton for other textile materials, following the invention of the cotton gin, which multiplied and cheapened many fold the supply of raw cotton. As a result, the South specialized in cotton culture, depending on the North and on Europe for manufactures; and there grew up the immense modern trade in cotton and cotton products.

In like manner the phosphate beds in the South have stimulated the demand for sulphuric acid, which is employed in preparing phosphatic fertilizers.

Finally the supply of some articles has been enlarged, with revolutionary effect on commerce, through the use of by-products previously thrown away. In some cases new commodities of great importance have been produced in this way. Thus gas and coal-tar are obtained from coal during the slow combustion necessary to produce coke; and from coal-tar in turn other valuable products are secured, including aniline dyes which have largely superseded vegetable and animal dyes.

77. The Law of Decreasing Returns. In every sort of production, the essential factors are land, labor, and capital. Moreover, they must be combined in the right proportion if they are to yield the maximum profit; in other words, a man would assuredly need more men and more teams to farm a section of land than a half section. If this right proportion is once reached and an attempt is then made to enlarge the business without increasing all three factors, the right proportion is

again destroyed and the returns cannot possibly increase proportionately. For example, if the farmer in question, after getting the right number of men and teams for his section should continue to hire more men without providing more teams or machinery, he would largely increase his expenses without getting much larger crops.

It is in connection with land that this law of decreasing (or diminishing) returns is most important; for the land surface of the earth is limited by nature and cannot be materially increased by man. It is, moreover, in agriculture that the land plays the largest role as a factor in production. Agriculture is consequently the industry most seriously affected by the law of decreasing returns.

As applied to land used in agriculture, this law amounts merely to the statement of a fact familiar to every farmer boy —that crops do not continue to increase in proportion to the labor employed upon the land. In other words, two men and two teams cannot raise twice as much wheat or cotton on a forty-acre farm as one man and one team. There is no getting away from this fundamental fact, even though improved machinery or methods should double or quadruple the yield of the land. It would still be true that two men could not raise twice as much wheat or cotton on a forty-acre farm as one man, using the same improved methods and machinery.

In these circumstances it is inevitable that as population grows denser there is a smaller surplus of agricultural products, especially of foodstuffs, for export, until finally the land no longer suffices to feed the people. Such has been the experience of England and Germany; and already New England, like Old England, contains three times as many people as it can feed from its own soil.

No nation, therefore, is so near famine as the one which, with a dense population, devotes itself exclusively to agriculture. This fact receives terrible illustration in China and India where the people can barely live even in years of

abundant harvests, and whenever the lean years come, the natives die by millions of starvation unless fed by foreign charity. In such countries, indeed, famine is practically the normal condition.

78. How the Law of Decreasing Returns is Offset. For thousands of years, in the Old World, every generation faced this grim riddle: how to maintain an increasing population on a fixed area of land? For failure to answer it, the penalties imposed by Nature were famine and pestilence; and the only alternatives open to men were emigration or war. Until within a century, therefore, the law of decreasing returns in agriculture has constantly urged nations to war for the conquest of more land, since that seemed the only way of increasing their food supply.[1] Witness the War of the Spanish Succession, 1702–1713, in which England won Gibraltar and portions of Canada and the West Indies; the Seven Years War, 1756–1763, waged between England and France for supremacy in the New World; and finally the Napoleonic War, which threatened England's supremacy in the Far East.

With the introduction of power machinery and of steam, however, a new answer to the old riddle became possible; namely, the export of manufactured goods and the import of foodstuffs from new countries which are still sparsely populated. This is obviously the geographic division of labor on a scale never before dreamed of. England, where power machinery and steam traction were invented, showed the way in this solution of the problem; and all the densely populated countries having coal or water power, together with the requisite skill and intelligence, hastened to follow England's example.

79. Economic Competition and War. Commercial supremacy thus means everything in the twentieth century that military supremacy meant in the days of Alexander and of Cæsar. At bottom, in fact, the ever-growing competition

[1]See the author's *War and Economics* in the *Political Science Quarterly*, December, 1900; also reprinted in Carver's *Sociology and Social Progress*.

between manufacturing nations for foreign markets is a form of warfare in which the intelligent and industrious survive, while the others are crowded to the wall among those designated by Lord Salisbury as "the dying nations."

Already this struggle for markets has become not less keen than was of old the struggle for land. Moreover, it has caused the foundation of new and the enlargement of old colonial empires. In order to guard their colonies and trade routes the nations of Europe have built mighty navies and sown the

Courtesy of the Honorable Bartlett Tripp, former U. S. Commissioner to Samoa

FIG. 24. *Pago Pago Harbor, where a coaling station for the United States Navy is now located.*

seas with fortified cable and coaling stations. (Fig. 24.) Finally, more than one war has been waged, like that between Russia and Japan, to secure or avert a monopoly of trade. When all is said and done the cannon remains the last argument, not of kings, as the old inscription reads,[1] but of nations; and it is true to-day, as never before, that the path to national prosperity and power lies over the waves.

[1]Formerly engraved on cannons: *Ultima ratio regum.*

VII—THE DEVELOPMENT OF TRANSPORTATION

"Those inventions which abridge distance have done most for civilization."
—Macaulay.

80. The Influence of Transportation. A tethered horse cannot graze beyond the length of his tether; nor can commerce extend farther, at any given period, than the expense of transportation allows.

Many of the older generation now living have heard their grandmothers tell how clothing was spun and woven at home. In those days nearly everything was produced on the premises where it was consumed; to-day, the four quarters of the earth are ransacked to furnish what we eat, wear, and use in our homes. This change is, in the main, the result of improved transportation, which promotes the geographic division of labor and consequently the development of commerce (§69, 70). (Fig. 25.) Thus, New England now depends largely on the Dakotas for wheat, sending cotton goods and shoes in exchange. So also, in respect to meat, wool, cotton, and all other staple products; each is more and more confined to those regions best fitted for its production.

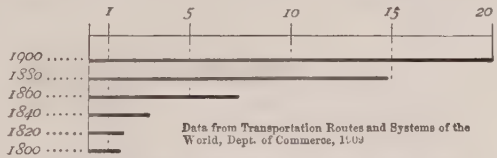


FIG. 25. *The development of world commerce in billions of dollars, during the nineteenth century.*

So intimate, indeed, is the relation of transportation to commerce that every improvement in transportation is felt immediately, like an electric shock, through every part of the industrial and commercial world.

81. Communication by Messengers. Among savages and at early stages of civilization there was greater need for the communication of intelligence, usually relating to military or

political affairs, than for the transportation of commodities. Such information was first conveyed by messenger. The runners employed by the Indians and by most ancient nations sometimes covered incredible distances. Phidippides, for example, ran from Athens to Sparta (nearly 150 miles by the road) in two days, before the battle of Marathon, to announce that the Persians had landed. The Peruvians before the Spanish Conquest, had regular relays of men stationed about a league apart, who were thus able to cover the ground at high speed, like runners in a modern relay race. The ancient Persians had similar relays of mounted messengers on all their main highways.

From the ancient use of heralds to convey messages to other nations has come the whole modern system of consuls, who look after business interests, and ambassadors, who have charge of political affairs, in foreign countries. Their importance has constantly grown with the increase of commerce. In barbarous states, like Turkey and China, consuls representing civilized nations even have authority to try cases in which their countrymen are involved.

82. The Post. With the advance of civilization written messages came to prevail. The Romans were probably the first to organize a regular postal service (*cursus publicus*) which, however, was intended solely for the use of the government. National posts date from about the sixteenth century. The rapid and reliable service of to-day is of course altogether dependent on steam transportation. (Fig. 52.)

The original idea was to make the post a source of revenue for the government by charging twenty-five cents or more for carrying a letter even a few miles. In 1840, however, the "Penny Post" was introduced in England. In 1845 the letter rate in the United States was reduced to five cents, and later to three cents (1851) and two cents (1883). Similar reductions were also made in other countries. These radical reforms vastly increased the volume of postal business, and consequently the commercial importance of the post.

The International Postal Union, which began operations in 1875, now includes most of the world. The foreign letter rate is five cents. The United States, however, applies the domestic rate of two cents to its outlying possessions, and to Canada, Newfoundland, Mexico, Cuba, Panama, Costa Rica, Honduras, Br. Honduras, Nicaragua, Salvador, the West Indies, Argentina, Colombia, Bolivia, Brazil, Ecuador, Peru, Br. Guiana, Spain, England, Scotland, Ireland, Wales, New Zealand, and U. S. Nav. Hos., Yokohama. The modern postal service makes all men neighbors, and possible customers, of one another.

83. The Use of Signals. Signals, like messengers, were among the earliest means of communication. The ancient

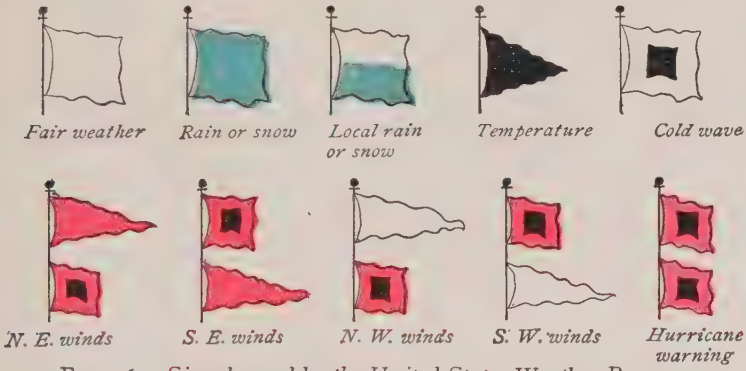


FIG. 26. *Signals used by the United States Weather Bureau.*

Gauls stationed men within sight of one another to wave or shout the news, which thus crossed the country in a day. Signal smokes were commonly used by the Indians, and signal fires made the coming of the Spanish Armada known throughout all England in a few hours.

Signals are still widely used. Fog horns and lighthouses warn vessels away from dangerous coasts or guide them into port. The weather forecasts are indicated by flags (Fig. 26) placed on towers and trains. The Army has a regular code of signals by mirrors that flash the sun's rays, and by flags, the latter system popularly called "wig-wag." Vessels at sea

communicate by flags or cannon. At night rockets are used or the searchlight is flashed against the clouds. Another signaling device used at sea is a submarine bell attached to the ship. The sound carries through the water for considerable distances and is caught by receivers on other vessels.

84. The Telegraph. The greatest triumph of the signal system came, however, through the use of electricity (1844). Wires and cables running everywhere over the land and under the sea have now literally annihilated distance, so far as communication is concerned; though it is still true that we pay a tribute to Nature (and perhaps still more to the telegraph and cable companies) in the form of heavy tolls for long-distance messages.

A still more marvelous thing is wireless telegraphy. By piercing dense fogs and warning vessels of one another's presence, it has immensely increased the safety of ocean navigation. Thanks to wireless telegraphy, passengers now receive messages in mid-ocean from their friends ashore, and read the news in a daily paper published on shipboard.

The telegraph has long since become an indispensable factor in commerce. It forms, indeed, the chief means by which the world-wide operations of modern industry and transportation are marshaled and controlled. In particular, it is essential to the safe and rapid operation of railways. It diminishes the stock which merchants need to carry, because orders can be speedily filled from the factory. It extends the market for staple commodities, such as wheat and cotton, till it includes the whole country or even the world. By so doing, it lessens the range and violence of price fluctuations; for a crop failure in one country may be offset by an abundant harvest in another, and the knowledge of this fact averts the danger of famine prices.

85. The Telephone. For local affairs the telegraph has been largely superseded by the telephone, which first came into general notice at the Centennial Exposition in Philadelphia (1876). By means of this marvelous instrument, the

human voice is audible from New York to San Francisco.

The telephone, moreover, competes, not only with the telegraph, but also with the post, the railroad, and the street railway. One of the most effective telephone advertisements reads: "Don't go, don't write, don't telegraph, telephone!" The telephone enables business to be transacted at almost any distance and in a fraction of the time formerly required. The retailer is thus relieved from the necessity of carrying a large stock, since the wholesaler is within reach at a minute's notice; and the customer, in turn, is no longer dependent on the small neighborhood store, but has at his command without loss of time the large retail or department stores.

The telephone has now penetrated the country, dispelling the loneliness which has hung about the farmer's home, bringing him in contact, not only with the city stores, but with the daily markets and events of the whole wide world. He may now sell his crops and order his supplies without loss of time and whenever the prices are most advantageous. Supplementing the telephone in many localities is the radio or wireless telephone.

86. The Tests of Transportation. As distinguished from communication, which has to do with ideas, transportation in the narrower sense is the conveyance of persons or commodities from place to place. The tests of its efficiency are: (1) cheapness, that is economy of force; (2) speed, that is economy of time. Efficiency means the conquest of natural barriers to commerce, such as seas, mountains, and deserts.

To economize force and time, the most direct route, other things being equal, is the best. At sea it is possible, in the main, to follow a direct route; but it is impossible on land, since that would involve the construction of a road from every place in the world to every other place. Consequently, the best that can be done is to provide direct roads between great cities, with secondary roads branching off from these.

87. Methods of Transportation. The development of transportation may be considered with reference to the propelling power, the way traversed, or the conveyance used.

The first power employed in transportation was muscular, derived either from man or beast. Later, natural forces such as winds, tides, and river currents came into use, mainly in connection with navigation. Finally, within the last 150 years, steam, and still later electricity, generated either by steam or water power, have become the great motive powers. Gasoline and compressed air are also of increasing importance. All these are natural forces, but artificially generated and controlled.

With reference to the way traversed, transportation is by land, by water, or by air; and land transportation may be divided into that carried on by road, by railroad, by pipe line, or by wire.

Finally, traffic by road is distinguished according to the conveyances used—porters, pack animals, sleds, or wheeled vehicles; and wheeled vehicles may be further distinguished as wagons, bicycles, automobiles, and railway cars.

88. Human Porterage. It would seem, sad to relate, that the first "beast of burden" was woman. This was the case among savages—for example, the American Indians—partly because the men objected to labor, partly because they had to guard against sudden attacks by wild beasts or hostile tribes. This use of woman still survives in many parts of Europe, where it is no uncommon sight to see a peasant woman and a dog hitched side by side to a market cart.

In some parts of Africa, where domestic animals suffer from the dreaded tsetse fly, human porters are the principal means of land conveyance. In China and Japan, moreover, the porters, sedan-bearers, and wheelbarrow and jinrikisha men perform the most extraordinary labor, all for a few cents a day, because overpopulation (relative to the means of producing wealth) has rendered human labor cheaper than that of beasts.

Nevertheless, there is usually no mode of transportation so expensive, in proportion to the weight moved, as human porterage. (Fig. 27.)

89. Pack Animals. The domestication of animals suitable for labor was thus a red-letter day in the history of man, providing for the first time not only a reliable food supply, but also ready means of transportation and the power necessary for agriculture. It is hardly an accident that civilization first developed in the Old World, where animals capable of domestication abounded, and that the most advanced civilization in America before the Spanish Conquest, the Peruvian, was associated with the llama and alpaca.

In the mountains and in backward countries generally, pack animals are still the principal means of transportation,

Courtesy of the Honorable O. P. Austin

FIG. 27. *Transportation by man power. The huge load is drawn by one man.*

especially the sure-footed ass, the mule, and, in the Andes, the llama. But in arid regions, such as central Australia (Fig. 28) and the district around Goldfield, Nev., the motor car and the traction engine with its train of wide-tired wagons have come into use. In fact, they have even invaded the desert regions of the Old World and now threaten to displace the picturesque camel caravans, which for untold ages have moved on silent feet through the desert solitudes.

90. Wheeled Transportation. The cart was quite as epoch-making in its day as the locomotive. The first carts,

FIG. 28. *The modern "ship of the desert"—Traction engine and wagons in Australia.*

to be sure, were crude enough. They were entirely of wood, two-wheeled, hard to move, and made the most unearthly creaking at every turn of the wheels. Such were the carts in which the ancient Germans carried their families on their migrations, and in which the French traders came to St. Paul from the Red River Valley about fifty years ago. (Fig. 29.) Carts of this type are still largely used in Mexico and other backward countries. But crude as they were, wooden carts increased at least tenfold the loads that could be moved.

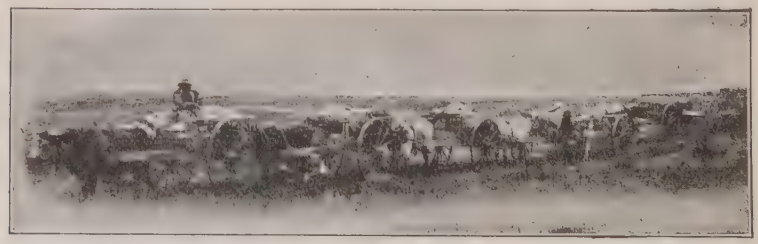


FIG. 29. *The old way—Red River carts.*

With improved wagons, the increase was twenty-five to a hundredfold. The invention of the cart was consequently the

basis of land transportation and, therefore in great measure, of civilization, from the age of the Pyramid Builders to that of Queen Victoria.

91. The Construction of Roads. Wheeled vehicles, however, were clearly limited to the open plains until roads had been constructed. Road building, therefore, marked the next great advance in land transportation. First begun in Mesopotamia, this work was carried out on a grand scale by the kings of Persia and later, in a still more magnificent way, by the Romans, whose roads were apparently built not for time but for eternity.

For nearly two thousand years all western Europe depended on these Roman roads, using and abusing them with seldom a thought of repairs. It was not until the nineteenth century (1816), when Macadam applied the method of road-making named from him, that decent roads again began to be constructed on any considerable scale. But at present, with the exception of certain mountainous districts in Spain and Portugal, which still linger in the pack-mule and wooden-cart stage of civilization, every country in western Europe has a network of splendid highways, stone-surfaced and with easy grades.

Unfortunately, the same cannot be said of the United States. For the most part, especially in the West, the country districts still depend on dirt roads that become quagmires for several months each year, and even in their best condition compel loads to be reduced nearly three-fourths as compared with macadamized roads.[1] (Fig. 30.) On dirt roads, haulage thus costs fully twenty-five cents per ton-mile against six cents on macadamized roads. Moreover, the farmers are forced to market their crops whenever the roads are good, even though (as usually happens) the prices are then low; and the railroads are compelled to keep thousands of cars standing idle most of the year in order to have enough when the crops are moving. The cost of marketing crops is thus a crushing burden on American agriculture and commerce.

[1]Jenks, *Road Legislation*, p. 12. (Am. Econ. Assoc. 1889.)

Courtesy of Department of Agriculture

FIG. 30. *More eloquent than words—A mud road and the same road macadamized.*

92. **The Railroad.** Distances are measured, for many of the purposes of commerce, not in miles but in hours. All the world to-day, by reason of steam, is no larger than the "tight little island" of Britain a century ago. Cæsar and Napoleon, although separated by eighteen centuries, yet saw about them essentially the same modes of life, labor, and travel; but the present age, separated by less than a century from Napoleon, is unlike any that ever went before. Previous ages could judge of the future by the past; but we have no means of telling what the future may bring forth. In all that pertains to industry, commerce, and government we are afloat on an unknown sea without compass or rudder. This transformation is the work of steam, aided in recent years by gasoline and electricity.

Courtesy of C. G. W. Ry.

FIG. 31. *Fifteen years' development in locomotives.*

The railroad, however, began modestly enough (1825), being little more than a stagecoach drawn by steam; but the march of invention soon raised its efficiency to the point where it superseded, except for short distances, all other modes of land transportation.

During the last thirty years better roadbeds and the use of Bessemer steel for rails and engines have permitted the weight of locomotives (Fig. 31) and pressure of steam to be quadrupled, while the power from a given weight of fuel has been tripled. Steel cars are now displacing wooden cars, just as steel ships have displaced wooden ships, thus permitting the carload to be tripled. For these reasons the maximum train load to-day is fully ten times what it was in 1850. Nevertheless, the

airbrake will stop the heaviest train in a short space. Special types of cars have also been developed for live stock, iron ore, coal, and perishable products. Refrigerator and heater cars enable perishable goods to be shipped across the continent, alike in summer or in winter. Electric railways, reaching out in all directions from the cities, are now extending modern transportation facilities even to rural districts. (Fig. 32.)

FIG. 32. *Trolley lines in the Middle West.*

All of these improvements affecting the three parts of the railway—track, engine, and car—have proportionately cheapened transportation, promoted the geographic division of labor, and therefore increased commerce. (Fig. 33.)

93. Pipe Lines. The earliest form of the pipe line was an open conduit. Canals thus served to irrigate dry regions like Egypt, drain swampy countries like Holland, and furnish cities with water. The Greeks and Romans built splendid stone aqueducts, whose ruins, dotting all the shores of the Mediterranean, are among the most impressive monuments of antiquity.

a. The familiar way—Twentieth Century Limited.

Courtesy of Bureau of Manufactures

b. The new way—Electric traction.

Courtesy of Aero Publishing Co.

c. The newest way—Airplane.

FIG. 33. *Modern progress in transportation.*

At present conduits are usually closed, except drainage and irrigation canals. Closed conduits or pipe lines serve sometimes for irrigation purposes, and commonly for carrying city water, gas, heat, sewage, and petroleum. The oil pipes extend for hundreds of miles across valleys and mountains, usually from oil fields to tidewater. (Fig. 71.) Steam or hydraulic pumps are used where gravity will not suffice to move the oil. The cost of transporting oil by pipe lines is less than a third of the average railway freight rate in the United States.[1] Even for irrigation purposes pipe lines are coming

Courtesy of U. S. Geological Survey

FIG. 34. *Old irrigation flume and new redwood stave pipe replacing it.*

into use, as they can be carried over valleys without expensive trestles. (Fig. 34.) In some cities, pneumatic tubes, built on the principle of a boy's air rifle, are used to expedite the handling of mail matter between postal stations.

94. Inland Navigation. Friction is less in the water than on the land; a horse can draw many times the weight in water that he can by road. Moreover, natural water ways are furnished free, and they never wear out. For these reasons

[1]The *Bureau of Corporations* reported the cost by trunk pipe lines as 2.38 mills per ton per mile, against an average freight rate by rail of 7.59 mills in 1907. (Report on Transportation of Petroleum.)

rivers constituted, until the last half century, the principal highways of inland commerce alike in Europe and America.

The first effect of steam was temporarily to increase the value of inland water ways, because a steamboat cost only a few thousand dollars, while a railroad called for millions. The half century before our Civil War was thus, in America at least, the golden age of river navigation. But thereafter, the greater regularity and speed of railways, especially where the water ways were icebound in winter, caused many rivers once thronged with traffic to be practically deserted. Such was the fate of the Missouri. The same fate overtook the smaller canals, while many others were bought up by the railways and either put out of service or prevented, by means of high canal tolls and inefficient service, from competing with the railways.

The almost exclusive reign of the railway is now, in turn, drawing to a close. Water transportation has proved indispensable if bulky commodities such as stone, coal, ore, and timber are to be handled on a large scale at low cost. To move such commodities downstream flat steel barges have been designed which carry a heavy load yet draw only two or three feet of water. Even streams with very rapid currents are rendered navigable by a steel chain in mid-channel which the vessel grips with a wheel driven by steam. In all these improvements the lead has been taken by Europe.

To compete with the railway, however, except for downstream traffic, a greater depth of water is necessary than in former years. The census of 1890 counted all rivers as navigable which had a depth of three feet; but to-day any river having a depth of less than six feet is inadequate and almost useless for general transportation. Canals, being narrower and navigated at a slower speed in order to avoid washing away the banks, are of little use unless twelve feet or more in depth so as to carry deep-draft barges.

95. Ship Canals. Most important of inland water ways are those ship canals which pierce land barriers, thereby connecting

different seas, like the Suez Canal. The Panama Canal will eventually modify ocean trade routes no less profoundly than did the Suez Canal. In the second rank are the Kiel Canal, from the North Sea to the Baltic; and the Corinth Canal, from the Adriatic to the Ægean.

In another class, ranking only a little below deep navigable rivers, are those ship canals which carry the sea to inland cities. Such are the great ship canals extending from the sea to Manchester, Amsterdam (on a bay too shallow for large vessels), Rotterdam, Ghent, and Bruges.

Measured by tonnage, the Sault Ste. Marie canals, connecting lakes Superior and Huron, though inland, far outrank even the Suez and Panama canals.

96. The Unity of the Sea. The Greeks under Xenophon, fighting their way back from Babylon against all the forces of the Persian monarchy, came one day to the top of a mountain whence they caught the gleam of the distant sea. Forthwith they fell to weeping and embracing one another, crying out, "*Thalassa! Thalassa!*" (The Sea! The Sea!); for they knew that they were saved. However distant, it was the same sea which washed the shores of their native land.

This fact is fundamental in history and commerce: the lands are many but the sea is one. Mountains, deserts, even continents separate, but the sea unites. Whoever stands upon its shores has before him an open pathway which he may follow, wherever the salt waves dash and the sea winds blow, even to the ends of the earth. It is this fact which alone renders possible world commerce.

97. Ocean Navigation. On the sea, sails remained the general motive power for more than five hundred years—from the latter part of the Middle Ages down to the middle of the nineteenth century. Then the greater speed and regularity of steamers began to tell. The decline of sailing tonnage was hastened by the Suez Canal (1869), which lies, like the Panama Canal (1914), in a region of calms. Recently, however, a new type of sailing vessel has appeared, of large size, steel

built, and equipped with auxiliary engines to handle the sails and cargo and sometimes to enter and leave port without assistance. (Fig. 35.) Such vessels will carry a larger cargo than a steamer of equal size, with a smaller crew, little expense for coal, and at but slightly lower speed.[1] In voyages of 5,000 miles or over, sailing vessels would seem to have a material advantage, because so much of the space in steamers is taken up by coal.

Courtesy of H. H. Morrison

FIG. 35. *The modern steel sailing ship.*

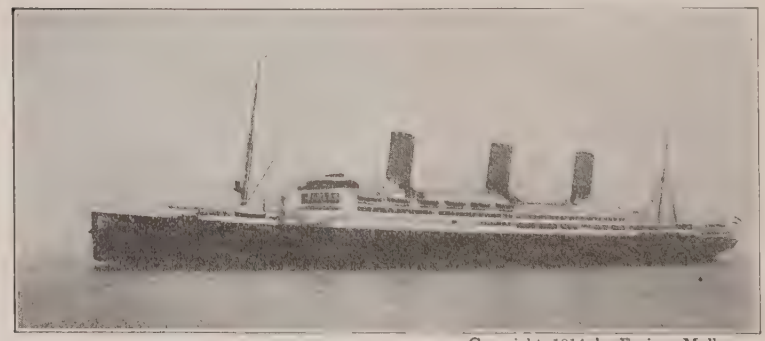
The first ocean steamships (Fig. 36) were small wooden side-wheelers which depended more on sails than on steam. Seagoing steamers to-day are mostly built of Bessemer steel, with double bottoms, several water-tight compartments, and are driven by high-pressure engines, which are attached to screw propellers. "Ocean greyhounds" now cross the Atlantic in less than five days, but at enormous cost for fuel. Their practical commercial value, except as carriers of passengers and mail, is therefore slight. The bulk of the world's commerce is borne by another type of vessel, the freighter, broad of beam and rather slow, but of enormous carrying capacity and very

[1]Such a vessel carrying over 5,000 tons of freight, sailed from Hamburg to Iquique (nearly 12,000 miles by the sailing route) in fifty-seven days.

economical of coal. For example, the "Minnesota," a vessel of this type built for the oriental trade, carried at one trip the contents of seven miles of freight cars (2,000 cars or fifty trains) and at an exceedingly low cost.

a. The "Savannah," the first ship to use steam in crossing the ocean (1819).

In the face of such achievements, it is no exaggeration to say that the ocean is alone completely subdued to the uses of man. The land, man's home, still exacts a heavy tribute, while the air as yet is little used for commercial transportation purposes.



Copyright, 1914, by Enrique Muller.

b. The "Leviathan"

FIG. 36. *The old and the new in ocean steamships.*

98. How Transportation Rates are Fixed. Transportation charges are fixed, as a rule, not according to the cost of the haul, but according to the supposed value of the service to the shipper. In railway circles this policy is called "putting on what the traffic will bear"; and its object, from the point

of view of the railway manager, is (in the words of a French statesman) "to pluck the goose so as to secure the maximum of feathers with the minimum of squawking."

From the economic view-point, however, the justification of the value-of-service principle lies in the fact that heavy commodities of low value, such as coal, ore, and timber, which obviously are the most expensive to haul, must be carried at very low rates, or they cannot be moved at all; yet it is essential to the utilization of natural resources and the development of industry and commerce that such commodities be transported wherever needed.

While value of service is the general principle governing transportation rates, it is subject to many modifications in practice. For example, there is a high rate on some goods, such as agricultural implements, because they take up much room. Again, the rate is relatively higher on short than on long hauls because, for one thing, the expense of loading and unloading is just as great for a short as a long haul. Finally, the rates by rail between certain districts are profoundly affected by competition, especially the competition of water ways.

In the case of the post, the value-of-service principle appears in the higher rate paid on letters than on printed matter. But a flat (or uniform) rate is made on all except the heaviest class of mail matter within a country, irrespective of the distance, because the larger part of the cost is due to the collection and distribution of the mail, and consequently does not vary with the distance.

For similar reasons it would seem that a flat rate would be economically justifiable on express, telegraph, and telephone traffic, at least within very wide zones. In point of fact, rates are commonly fixed on this basis in countries where the government operates these businesses as a part of the postal system.

99. The Uses of Wild Animals. To savage man, wild animals were the staff of life; to civilized man, they are largely a means of recreation. The delight in hunting and fishing, felt by all right-minded boys and most men, harks back to the ages when to be "a mighty hunter before the Lord" meant all that it means to-day to be a captain of industry.

By reason of this hunting instinct in man, the fish and game of forested regions like northern Maine and Minnesota are a commercial asset of large value, drawing yearly thousands of visitors.

From wild animals are also obtained several important commodities, especially furs, feathers, and ivory.

100. Furs, Feathers, and Ivory. Since the days when the inhabitants of northern Europe were clad in the skins of wild beasts, according to the Roman writers, furs have been an important article of commerce. Their influence in opening up new lands has been very great. It was fish that brought the French to Canada, but furs that drew them ever farther into the interior of the continent.

Furs are mainly the product of cold, forested regions, such as northern Canada and Siberia; though some animals, particularly the muskrat, mink, and skunk, are still found in settled districts.

Ornamental feathers and ivory, on the other hand, come mainly from warm countries, where birds of bright plumage and ivory-bearing animals such as the elephant and hippopotamus are now at home. Some fossil ivory is also obtained in Siberia, where the mammoth once abounded.

101. The Harvest of the Sea. More valuable, however, than furs or ivory are fish, which form the only considerable food supply still produced spontaneously by nature.

Fish abound in nearly all shallow waters, but are firmer fleshed in cold regions, where they can also be more readily cured or marketed without spoiling. The most important fishing banks or shoals are consequently near the continents in high latitudes, where the fish feed or spawn at certain seasons. The species of greatest commercial value are the cod, herring (Fig. 37), and mackerel in the Atlantic Ocean, and the salmon in rivers tributary to the Pacific. Important also are the lobster and several shellfish, especially the oyster.

FIG. 37. *Pursing a seine about a school of herring in Boston Harbor.*

By means of refrigeration fresh fish now reach the interior of the continents. Cured fish (dried, smoked, or pickled) are largely consumed in the Tropics, since they will keep indefinitely and are cheaper and less heating than meat. Salmon are mostly canned for market.

Other marine products are whale oil and whalebone, walrus skins and seal skins from cold waters; pearls, pearl and tortoise shells, coral, and sponges from tropical waters.

102. Dairy Products. Wandering shepherd tribes were the first to make use of dairy products, employing as milch animals sheep, goats, and horses, as well as cattle. The goat

is still the milch animal of hot countries, as the cow is of cool regions. Roquefort cheese is made from the milk of sheep; Parmesan cheese from the milk of goats.

As a factor in international commerce, however, the dairy industry depends mainly upon the cow, and consequently tends more and more to be localized in cool, well-watered regions having abundant pasturage. (Fig. 38.) This localization is especially noticeable where the land is too wet for grain farming, as in Holland; or too sandy, as in Denmark; or too broken, as in Switzerland; or too valuable, as in the eastern part of the United States near great cities. Owing to steam

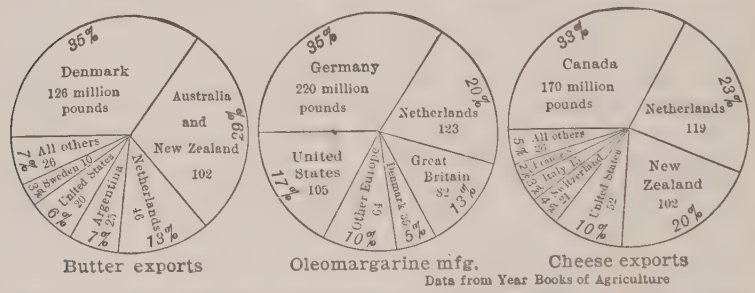


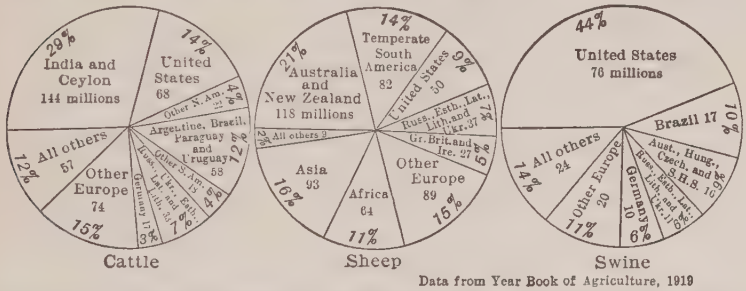
FIG. 38. *Dairy products and substitutes. Averages for three years, totals (million pounds); butter exports, 355; oleomargarine made, 629 (latest available world data); cheese exports, 513.*

transportation and refrigeration, butter now reaches the London market in prime condition even from New Zealand, on the opposite side of the globe.

103. Eggs and Honey. Similar to the dairy business and often associated with it is the keeping of bees and poultry for their products. The quality of honey seems to depend in part on the soil, which affects the nectar of flowers. Mount Hymettos, near Athens, has been renowned for honey since ancient times. The keeping of poultry for eggs has received a great impetus from the use of cold storage. The poultry industry is most profitable and therefore most important in well-drained regions, where grain or other food is abundant and cheap, especially where small farms prevail.

104. Meat Products. Before the days of railroads each farmer kept a few head of stock for his own use. Steam has now, to a great extent, concentrated the grazing industry in regions too dry for agriculture, though the feeding industry (fattening stock for the market) is largely carried on in agricultural districts producing forage crops, as in the corn belt of the United States. Grazing regions are found on the dry side of mountain ranges, as in Australia and South Africa.

Swine are raised as consumers of waste materials in many parts of the cool zones. Thus in Denmark, where the principal product is butter, the raising of swine on the skim milk is an important by-industry. Swine are also raised on a large scale in two districts, both possessing food of a high fattening



Data from Year Book of Agriculture, 1919

FIG. 39. *Live stock, average for latest available years. Totals (in millions): Cattle, 491; sheep, 569; swine, 174.*

power: the oak forests of the Balkan Peninsula, where the swine run at large and feed on acorns, and the United States, where they are fed on corn. (Fig. 39.)

105. Leather and Animal Fibers. All the larger animals, including the alligator and walrus, furnish skins suitable for leather.

Men early learned how to preserve skins from decay, either by rubbing in oil, as the Indians did in tanning buckskin, or

Courtesy of Bureau of Animal Industry

FIG. 40. *Angora goats in the dry Southwest.*

by soaking the skins in a solution of some plant containing tannic acid, such as oak or hemlock bark. Before the days of refrigeration, in districts remote from markets like Argentina, cattle were commonly raised for their hides alone.

The principal animal fiber used in weaving cloth is wool. This is obtained commercially not only from the sheep, but also from the Angora (Fig. 40) and the Cashmere goat, from some varieties of camels, and from the alpaca and vicuña of the Andes. The finest wool, such as merino, comes as a rule from dry uplands. Both sheep and goats flourish where cattle would starve. As a result of steam transportation, the industry of wool growing has largely shifted to the semi-arid parts of Australia, Argentina, South Africa, and the United States.

The fur of squirrels, rabbits, nutria (an animal from Argentina resembling the beaver), and domestic cats is also pressed or "felted" into a kind of cloth used in the manufacture of hats. The felting quality is due to saw-like teeth on each fiber, so small that they can be seen only through a microscope.

Next to wool, the most important animal fiber is silk. This is the gossamer-like thread spun by the silkworm, a caterpillar that feeds on the mulberry tree. China, where silk was first used, was long known to Europe as Serica, "the Land of Silk." Eastern Asia still furnishes the bulk of the raw silk. An artificial silk is now made from vegetable matter which is much cheaper and hardly to be distinguished in appearance from the genuine article, though less durable.

106. How Plants Connect Man with the Earth. Savage man, living by the chase, was indeed exposed in person to all the rigors of climate. The Indian in his wigwam had little protection against storm or frost. Nevertheless, his mode of life was largely independent of soil and climate, except as these affected the game which he pursued. The practice of agriculture, on the other hand, at once rendered man directly dependent, for the necessities of life, upon soil and climate.

Following this mode of life, he could live only where his food and fiber crops would ripen.

107. Forest Products. The forest was no doubt the original home of man, and timber the first material used for tools and weapons. Its value has not lessened, though its uses have changed with the advance of civilization.

The temperate forests contribute to commerce largely soft woods, such as pine, fir, and spruce, which are at once durable and easily worked, besides turpentine, pitch, and rosin[1] obtained from the same species.

FIG. 41. *Freshly tapped gutta-percha tree, with leaves spread to catch the flow.*

Tropical forests yield cabinet woods of great beauty, such as mahogany and rosewood. These woods are very costly because scattered through dense jungles and therefore difficult to get out. Tropical forests also produce numerous drugs, dyestuffs, resins, gums; and, most important of all, rubber and gutta-percha. (Fig. 41.) These various substances occur in the sap of many unrelated plants.

The rubber industry, founded on Mackintosh's invention (1820) of waterproof goods, and Goodyear's discovery

[1]Resin is a general term for sap products soluble in alcohol or turpentine, but not soluble in water. It therefore includes rosin as a special variety. A gum, on the other hand, is soluble in water, but not soluble in alcohol or turpentine. Gum-arabic, used in mucilage, is an example.

(patented 1844) that rubber can be hardened by sulphur, has received an additional impetus from the use of rubber tires. Recently a process has been invented for making rubber from starch.

Gutta-percha is indispensable for coating submarine telegraph cables, being resistant to the action of salt water.

108. **Cultivated Plants.** Some species of plants, as of animals, are useful to man: these are his friends. Others enter into competition for the same food or the same soils: these are his enemies.

Competitors for the same food are parasitic plants, such as fungi, and countless varieties of insects that feed upon what the farmer has planted for his own use. Competitors for the same soil are all wild and useless plants, called weeds, which tend to choke out the crops.

Some one has asked why crops do not thrive untended, in place of weeds. The answer is simple. By selecting seeds man develops qualities in plants which suit his purpose, but they are seldom qualities which fit the plant for the natural struggle for existence. Crops do not thrive untended because weeds are natural, while crops are, in a sense, artificial.

109. **Fruits and Nuts.** In the Tropical and Subtropical zones, certain fruits and nuts are the chief support of large populations; for example, the mango and bread fruit in the East Indies. Others also enter extensively into commerce. Such are the date, fig, and cocoanut (Fig. 42), all dried for export; the grape, yielding raisins and wine; the olive, native to the dry subtropical region, which is either pickled or crushed for oil; the almond, chestnut, pecan, and walnut, which form the chief nuts of commerce. Even fresh southern fruits, especially the banana, grapefruit, and orange, now appear in northern markets through the agency of rapid transportation and cold storage.

This is no doubt the beginning of a commercial movement by which the fertile soil of tropical lands, where it is always summer and harvest time never ends, will be increasingly laid

under contribution to feed the colder and, in this respect, less-favored regions of the earth.

In the Temperate zones, the leading fruits are the apple, which will keep for months in its natural condition, and the plum, known when dried as the prune. The processes of canning and preserving have largely increased the commercial importance of perishable fruits like the peach and pear.

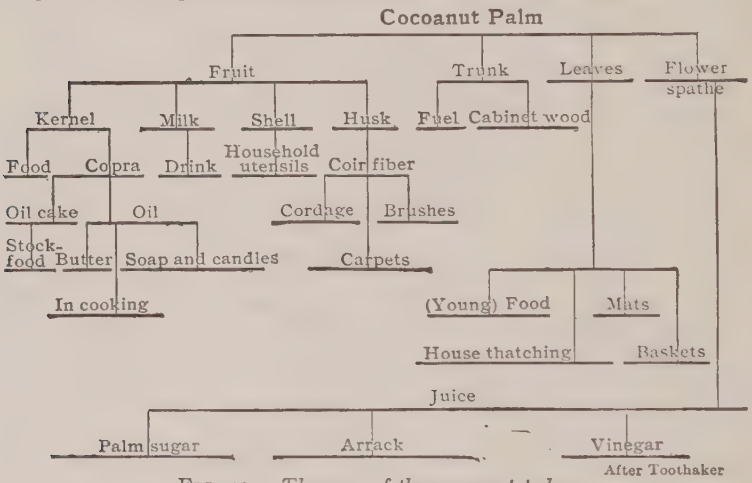


FIG. 42. *The uses of the cocoanut palm.*

110. Root and Pod Crops. In warm countries edible roots and stocks largely take the place of grain. This is the case, for example, with yams and sweet potatoes in the West Indies; *taró* in Hawaii; the sago palm, the pith of which forms the sago of commerce, in the East Indies; and manioc (cassava, yucca), which yields tapioca, in Brazil and Central Africa.

Pod crops which are rich in protein also serve as a partial substitute for meat in such countries; for example, chick-peas in Spain and North Africa, and soy beans in India.

In the Temperate zones the principal root crop is the potato, native to America, which formed the basis of the Inca civilization in Peru. It will grow on poor soil, at high altitudes

and latitudes, maturing nearer the pole (70° 40′ in Norway) than any cereal. Next in acreage and value is the onion.

Root crops are in general too bulky to enter largely into international commerce. Moreover, the predominance of root crops for food, as in the Tropics, usually marks an inferior stage of agriculture and of civilization. Root crops are, however, commonly rotated with grain on the same soil, where scientific farming prevails.

III. **The Cereals.** The grains are mainly seed-bearing grasses. Barley, which Pliny considered the most ancient food of man, has the widest climatic range (20° to 70° north

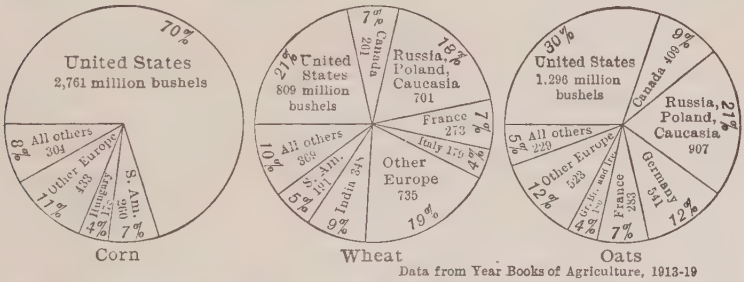


FIG. 43. *World crops of corn, wheat, and oats. Averages for five years, totals (million bushels): corn, 3,936; wheat, 3,866; oats, 4,368.*

latitude). Though formerly the chief breadstuff of the Hebrews, Greeks, and Romans, it is now more commonly fed to stock. With hops, it is also used in brewing beer.

The principal tropical grains are rice, grown mostly in standing water, and millet (*durrah*), which needs a dry soil. Rice supports nearly a third of the human race in eastern Asia; millet is the leading cereal in the dry parts of India and Africa.

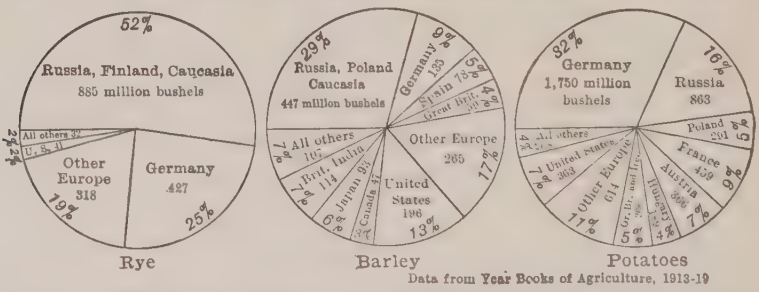
The warm temperate grains are corn (maize) and winter wheat; the cool temperate grains are spring wheat, oats, and rye. (Fig. 43.)

Corn needs a warm, moist climate and is consequently grown chiefly in regions of summer rains. It was widely cultivated in America before Columbus, and still has probably the

largest acreage of any grain in the New World.[1] It is mostly fed to live stock, though corn meal serves as food for man, and much corn is made into starch, glucose, molasses, and whisky. (Fig. 45.)

Wheat, of both the winter and spring varieties, flourishes best in a region of winter or spring rains but warm and rather dry summers. It is the staff of life for the white, as rice is for the yellow, race and enters more largely into commerce than any other cereal. (Fig. 43.)

Oats and rye flourish in cooler and moister climates, rye also on poorer soil than wheat. Oats was apparently the original breadstuff of northern Europe, but now serves chiefly as horse



Data from Year Books of Agriculture, 1913-19

FIG. 44. *World crops of rye, barley, and potatoes. Averages for five years, totals (million bushels): rye, 1,703; barley, 1,541; potatoes, 5,371.*

feed. Barley, maize, and oats are thus the principal fodder grains. Rye forms the "black bread" of the peasants in Europe and, like corn, is used in distilleries. (Fig. 44.)

Buckwheat, a relative of our common dock or sorrel, will grow on even more sandy soil, and in a shorter season, than rye. Hence it is a favorite crop in the mountains, and a "catch crop" elsewhere, being sown after some other crop has failed.

112. Condiments. In former times, when nearly all meats were dried or salted, East India spices[2] were in great demand

[1]Water rice (*Zizania aquatica*) was another important food of the Indians. Analysis shows it to be perhaps the most perfect cereal, but no practical methods of cultivation have been as yet devised.

[2]Chiefly black pepper, cloves, nutmegs, and cinnamon. Pimento, red pepper, and vanilla were native to America. Mustard, a temperate country plant, is widely used, yet figures little in foreign trade.

owing to their biting, aromatic qualities. During the Middle Ages, indeed, condiments were more important commercially than foodstuffs. Pepper and vanilla are now the most important of the spices in commerce.

During the last few centuries, sugar, previously unknown, has become the leading condiment. It now ranks with wheat and cotton as a world commodity. The principal sources of sugar are the sugar cane and sugar beet. Cuba and India produce much cane sugar, Cuban sugar being the more important commercially. Germany has led in beet sugar. (Fig. 278.)

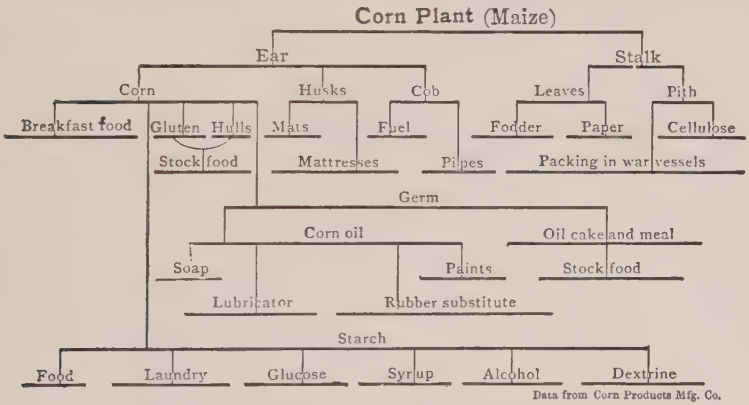


FIG. 45. *Industrial uses of the corn plant.*

113. Stimulants. Several plants which stimulate the nervous system have also become of great commercial importance in modern times. Such are coffee, native to the mountains of Abyssinia, and tea, apparently first used in China. Curiously enough, cocoa (or cacao), an American plant having a similar stimulating effect, became known in Europe a century before either tea or coffee, both Old World products. Chocolate is a preparation of cocoa.

Another plant native to America, though now grown in many parts of the world, is tobacco. In eastern Asia opium has been commonly smoked in place of tobacco. There are in addition many narcotic plants employed only in certain countries.

An artificial stimulant is alcohol, produced either by fermentation, as in wine, cider, and beer; or by distillation, as in rum, brandy, and whisky. Any fruit or grain, besides potatoes, molasses, and honey, may be used for this purpose.

114. Fiber Crops. Next to food, the most imperative need of man is clothing. Flax (linen) is found in prehistoric lake dwellings of Switzerland, and in Egyptian tombs that antedate the pyramids. It is, however, too expensive for common use, because the fiber must be separated from the stalk by hand.

For this reason cotton has become, since the invention of the cotton gin (1793), the leading vegetable fiber. (Fig. 46.) The trade in cotton and cotton manufactures is perhaps the

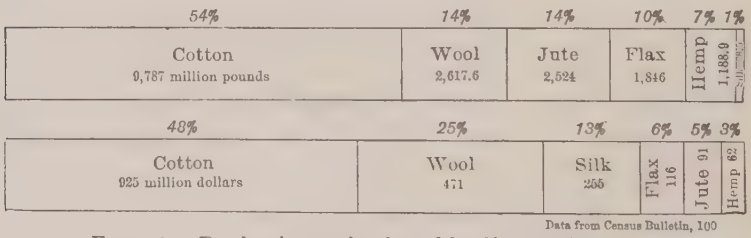


FIG. 46. *Production and value of leading textile fibers.*

most important branch of international commerce. Cotton will indeed grow in a variety of climates, but produces the finest fiber in a warm climate near salt water. Abundant moisture is also necessary. The principal cotton-growing countries are the United States, India, China, and Egypt. (Fig. 47.)

There are four fibers of commercial importance for bags and cordage. Hemp was originally in sole possession of the market; but as no satisfactory gin has been invented to extract the fiber, hemp has been largely superseded, for bags, by jute grown in India where labor is cheap; and for cordage, by sisal (*henequen*) from Mexico. For heavy ropes, however, Manila "hemp" (*abacá*) is indispensable.

115. The Influence of Minerals. Civilized man depends for the advantages he enjoys over his barbarous ancestors chiefly

on the mineral kingdom. Take away the minerals and all modern manufactures would become impossible, and commerce, except in the original form of barter from tribe to tribe, would speedily disappear from the face of the earth.

In all ages important mineral deposits have consequently attracted population: as shown by Stonehenge, over the flint beds which once furnished tools and weapons for England; and by many mining towns to-day. Butte, Mont., a copper

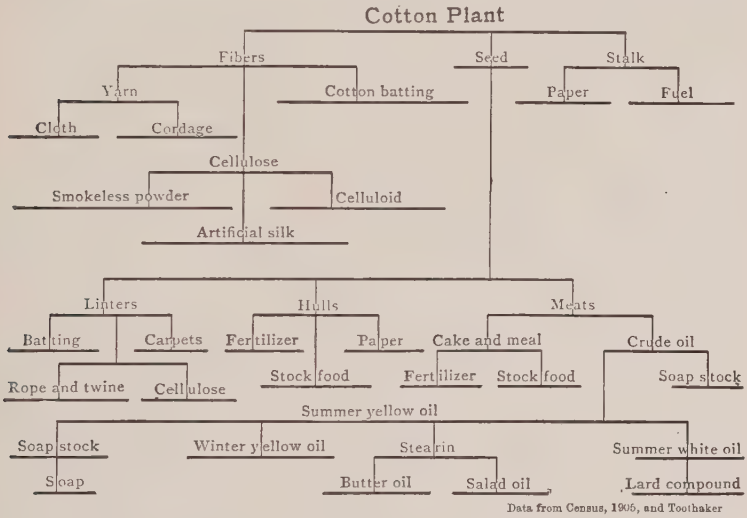


FIG. 47. *Industrial uses of the cotton plant.*

city, and Johannesburg, South Africa, a city built on gold, are typical examples.

116. Structural Materials. Stone, copper, and iron have successively formed the mechanical basis of civilization, and have given their names to the ages of Stone, Bronze, and Iron.

Stone, which was no doubt the first, is still one of the most important of the mineral resources used by man. It now serves chiefly for buildings and for surfacing highways.

Where neither timber nor stone was available, a serious difficulty arose. Nomads could live in tents; but what was

civilized man to do? This problem was solved by the invention of brick, which alone made possible the palaces, the cities, and the gigantic walls of ancient Mesopotamia.[1] In modern times, especially in the United States, brick is coming into ever wider use as our forest resources dwindle. Tile and pottery, like brick, are also made chiefly of clay.

Another structural material invented in prehistoric times was glass, doubtless made at first by melting together sand and salt from the seashore. Without glass or coal, it is difficult to see how civilization could exist at all in high latitudes.

In recent years there has been a striking development of the cement industry. Portland cement, made usually of limestone and clay heated to about 3,000° F., has the invaluable quality of setting or hardening under water. Without this material, more durable than natural rock, railroad tunnels, subways, and concrete construction generally would present great, if not insuperable, difficulties.

Cement and steel are indeed the mechanical bases of modern industry and transportation.

117. Mineral Fertilizers. Experience shows that there are three elements which tend to become exhausted in soils continuously under cultivation, yet are absolutely necessary to crop production. These elements are nitrogen, phosphorus, and potassium. The problem of feeding the ever-growing population of the world, therefore, largely resolves itself into the problem of restoring these elements to the soil as fast as needed. For this purpose, certain mineral fertilizers are of the utmost value.

Nitrogen occurs abundantly in the form of nitrate of soda in the arid region of northern Chile. It is also possible to obtain a usable form of nitrate (*ammonium sulphate*) as a by-product from coke ovens, and even to manufacture artificial nitrates, though these processes are still relatively expensive.[2]

[1] R. von Ihering, *The Evolution of the Aryan.*

[2] Nitrate of lime, by the use of a powerful electric current; and calcium cyanamide, by passing air over hot calcium carbide. The source of the nitrogen in both cases is the air.

Nitrogen can likewise be restored to the soil by planting clover or other legumes which have the power (through bacteria inhabiting their roots) of getting nitrogen from the air.

Phosphorus is obtained from phosphate-rock deposits in various regions, notably the South; and also from the slag of steel mills using the basic process.

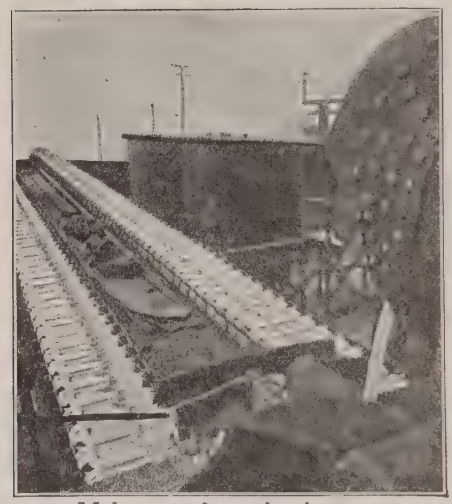
Potassium, or potash, occurs in great deposits near Stassfurt, Germany. It is also a constituent of wood ashes.

118. Copper. In Homeric Greece the leading material for tools and weapons was copper alloyed with tin to form a hard and tenacious bronze.

In modern times copper is also alloyed with zinc to form brass, and with aluminum and manganese to form other kinds of bronze. Manganese bronze, being tough and enduring, is employed for steamship propellers. Copper has, however, been restored to the rank of a great industrial metal, second only to iron, mainly through the fact that it is one of the best conductors of electricity.

119. Iron and Steel. Iron was difficult to master on account of its high fusing point (about 2,790° F.). But iron, with its derivative, steel, is the basis of all modern industries; for no other metal is so well adapted to fine tools or power machinery for either manufacturing or transportation. The production of iron and steel is, therefore, generally taken as an index of the relative industrial development of nations. Cast iron contains up to 5 per cent of carbon, besides other impurities; it is hard but brittle. Steel is of various grades, varying as to its carbon content from .3 to 2.0 per cent; it is in general hard and also tough. Wrought iron contains practically no carbon, and is malleable but soft.

A modern blast furnace consists of a high stack, through which hot air (1,400°–1,650° F.) is constantly driven from below, while from above automatic cars dump in ore, coke, and limestone—the stone to promote fusion. In place of coke, natural gas, petroleum, or electricity may be employed. The molten iron runs into cups moving on an endless chain,



a. Molten metal pouring into cups on endless chain.

b. Dumping cooled iron automatically into waiting cars.

FIG. 48. *Modern method of handling pig iron.*

or into trenches on the sand floor, forming "pig" iron (Fig. 48); or is carried directly to the steel mill to avoid remelting.

The removal of the carbon necessary to transform iron into steel may be accomplished either by raking or "puddling" in an open-hearth furnace, or by driving a blast of air through the molten metal (Bessemer process). In either case, the carbon is burned out by coming in contact with air. If phosphorus is present, it is absorbed by lime (basic process). To toughen the steel, a little manganese is added; to make it very tenacious it is alloyed with nickel, chromium, or tungsten. Thus, nickel steel is used for steel rails on curves, high-power rifles, and armor plate on war ships; chromium steel for burglar-proof safes and for armor-piercing projectiles.

120. Lead, Zinc, and Tin. Lead and zinc are frequently associated in nature, and both form compounds used in paints. Metallic lead is employed for water pipes, since it is not corroded by water; also for bullets, and in various alloys such as type metal. Metallic zinc enters into brass, is one element in electric batteries, and serves to protect iron from rust.

Tin, being highly malleable and not easily corroded, is also used as a coating on iron, forming tin plate. It has become important through the increased use of canned foods.

121. Precious Metals and Stones. Gold and silver, also various stones such as the ruby and diamond, early attracted attention by their color and luster. These were consequently used as ornaments and came, through human love of display, to command fabulous prices. For this reason they were called "precious." Most of the silver and much of the gold mined are still consumed in the arts.

Gold is frequently found free in nature, that is, not combined with other substances. It is either washed from river gravels or obtained from quartz veins, by quarrying and crushing the rock. Quartz mines now yield more than gravels.

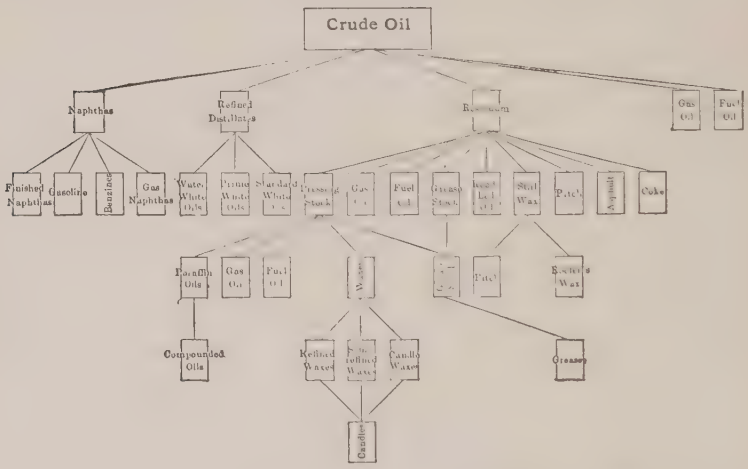
Silver usually occurs in combination with other elements, especially lead and copper, yet it is more cheaply mined than gold. Owing to the increasing production of silver since 1870, its value, compared to gold, has declined more than one-half.

The output of gold has also increased greatly since 1897. Thus its value has fallen, precisely as the price of wheat does after abundant harvests. In the case of gold, which forms the standard money metal, the fall in value is reflected in the advancing price of most other commodities.

122. Mineral Fuels. The ancient Persian Fire Worshipers made pilgrimages to the Caspian Sea, where columns of flame issued from the earth. It remained for Americans to put natural gas to more practical uses (1821). It is thought to have been driven off by heat and pressure from petroleum or coal, and gives an intense heat.

Petroleum or rock oil was first obtained by boring, in the

United States (1859); this country produces about two-thirds the world's output. The crude oil is an efficient fuel; when refined it yields a series of valuable products. (Fig. 49.) Gasoline serves as fuel for internal combustion engines, benzine as a solvent of rubber, and kerosene for lighting purposes. The heavier residuum yields valuable lubricating oils, vaseline used in ointments, and either paraffin for candles or asphaltum.



Data furnished by Standard Oil Co.

FIG. 49. *Industrial products of petroleum.*

Coal is vegetable matter buried under marine deposits and gradually transformed by heat and pressure. It varies from the hard or anthracite coal, which runs from 90 to 95 per cent pure carbon, down through various grades of bituminous or soft coal to the lignite or brown coal, which may not have over 40 per cent carbon, and is, in fact, only peat slightly altered. Coke, a sort of artificial anthracite, is made from soft coal by partial combustion in an "oven" nearly closed to the air. Coal tar, a by-product of coke making, is the source not only of aniline dyes, but also of perfumes and an almost endless series of chemicals and drugs. (Fig. 50.)

Coal fields draw to their neighborhood nearly all kinds of manufactures; consequently, while the production of iron is a measure of the actual industrial development of a nation, its possible development is largely measured, in so far as it depends upon nature, by the available supply of coal. (Fig. 51.)

Coal, moreover, alone renders commerce possible as conducted to-day. We are carried with the speed of the wind

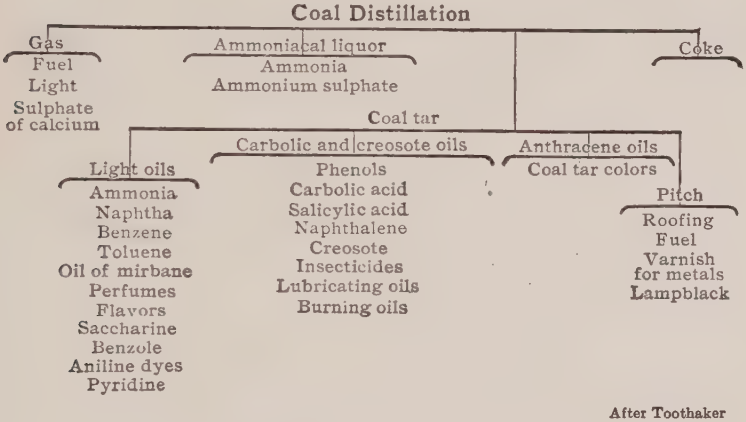


FIG. 50. *Industrial products of coal distillation.*

over land and sea because we have harnessed to our service the power of the sun, stored up through millions of years in

52%	17%	13%	11%	7%
United States 3,839 million tons	Canada 1,234	China 996	Europe 784	All others 545

Data from International Geological Congress XII

FIG. 51. *Estimated coal reserve of the world.*

the recesses of the earth. Coal is king to-day, though electricity may be king to-morrow.

PART II

CONTINENTS AND COUNTRIES

IX—THE MAKING OF THE UNITED STATES

123. The Position of North America. North America fronts Europe across a relatively narrow ocean. (Fig. 14.) This has been well called the most important geographic fact relating to the New World. Had America been as near to temperate Asia as it is to Europe, it would doubtless have been peopled by Japanese or Chinese long before the time of Columbus. And had America been as far from Europe as it is from Asia it could not have been so readily colonized by Europeans, nor could the colonies, or the United States, isolated from European influence, have made such rapid progress.

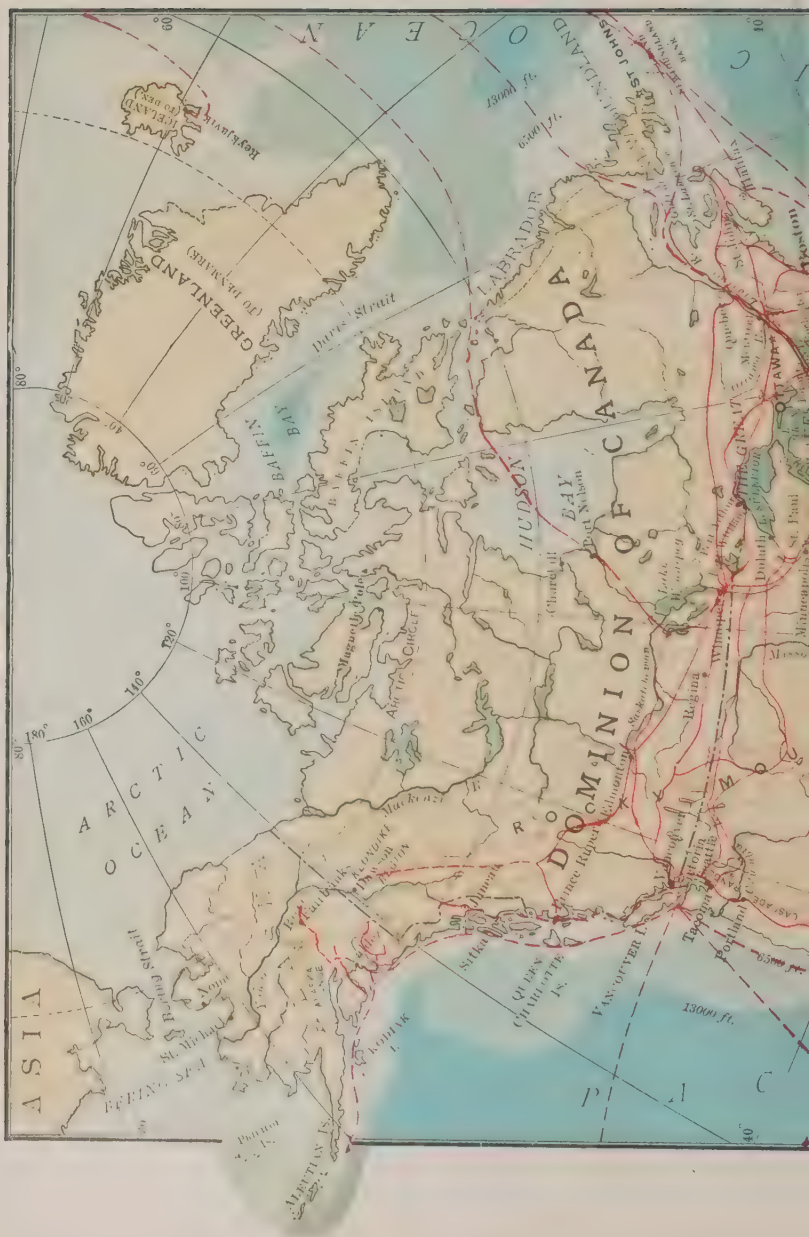
124. Coast Line and Surface of Temperate North America. The three physical foundations of material greatness are wealth of territory, wealth of minerals, and wealth of sea coast: the first two giving power of production, the third facilitating the distribution of products. In all three respects, temperate North America is exceptionally well endowed.

In the proportion of coast line to area, North America ranks next to Europe. Moreover, it has five great "unsalted seas" connected with one another and with the ocean—a feature found in no other continent.

The dominant surface features are two extensive plains, the Coastal Plain bordering the Atlantic, and the Central Plain extending from the Arctic Ocean southward, the two merging along the Gulf of Mexico; and two great highland areas, the Appalachian and the Cordilleran, both running in a general north-and-south direction, roughly parallel to the oceans. (Fig. 53.)

These surface features largely control the distribution of

FIG. 52. *Telegraph, cable, and postal routes.*



ASIA
ARCTIC OCEAN
GREENLAND
(TO DENMARK)
ICELAND
(TO DEN.)
Heykjavik
Davis Strait
BAFFIN BAY
LABRADOR
HUDSON BAY
Port Nelson
Churchill
Magnetic Pole
ARCTIC CIRCLE
DOMINION OF CANADA
Edmonton
Regina
Winnipeg
Duluth
St. Paul
Minneapolis
Quebec
Montreal
Halifax
Boston
OTTAWA
ST JOHNS
Vancouver
Victoria
Seattle
Tacoma
Portland
Prince Rupert
Sitka
Dawson
Mackenzie R.
Fairbanks
Nome
St. Michael
Bering Strait
BERING SEA
ALEUTIAN IS.
KODIAK I.
QUEEN CHARLOTTE IS.
VANCOUVER I.
13000 ft.
6500 ft.

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FIG. 53. *North America.*

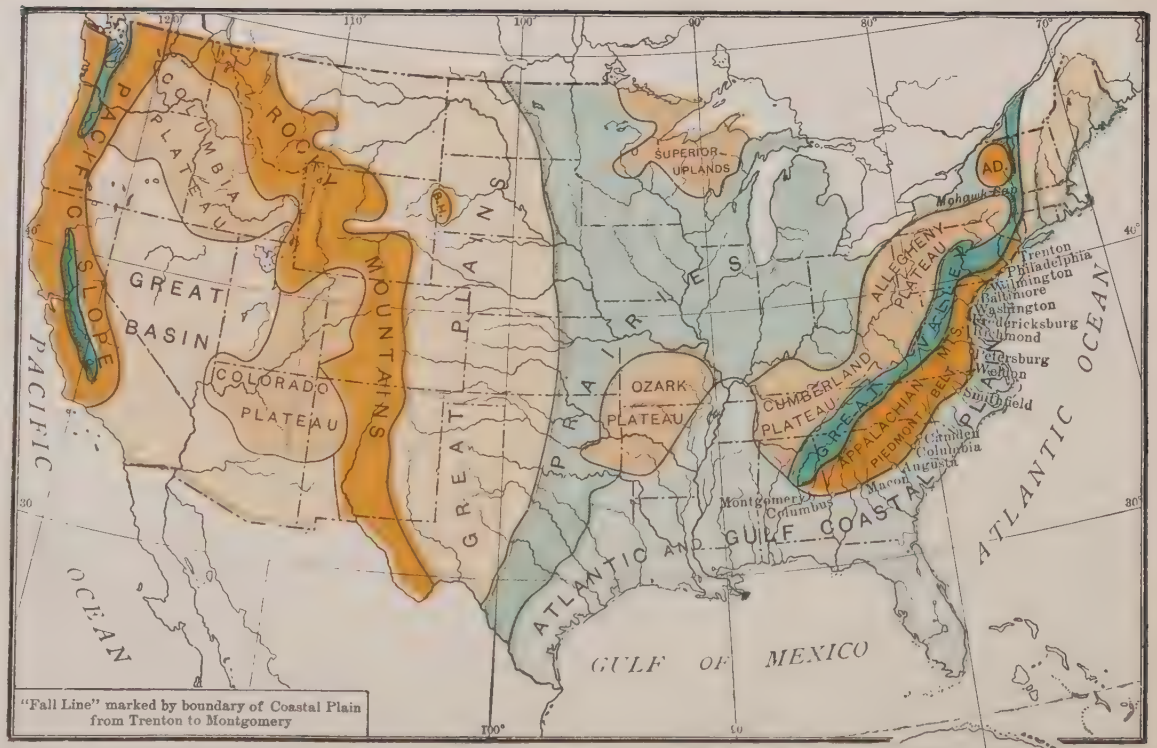


FIG. 54. *Physical divisions of United States.*

natural resources, the routes of transportation, and the climate throughout the continent. As a result, they naturally determine in great part the location of industries and therefore the distribution of population. (Figs. 55 and 58.)

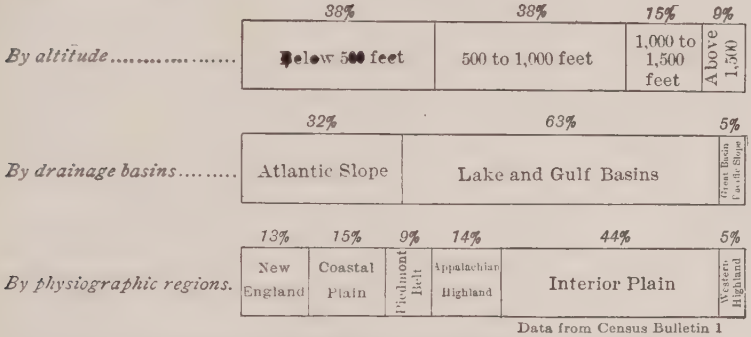


FIG. 55. *Relation of physiography to population in the United States.*

125. The Coastal Plain and the Appalachian Highland. The Coastal Plain, rising gently from the Atlantic, is bordered toward the west by a hilly or Piedmont region extending to the foot of the mountains.

The Appalachian Highland, averaging perhaps 200 miles in width, comprises three distinct divisions: the eastern range, known in Virginia as the Blue Ridge; the Great Valley, forty to sixty miles wide and extending from the St. Lawrence well into Alabama; and fronting this valley on the west (in places as a cliff 1,000 feet high), the rugged Catskill-Allegheny-Cumberland Plateau.

The Great Valley, formed in a belt of weak and easily-eroded rocks, is occupied in part by Lake Champlain, and the upper courses of the Hudson, Delaware, Susquehanna, Potomac, and James rivers, which being older than the mountains have kept their channels open through the slowly rising eastern range. Because of these water gaps, the northern portion of the Great Valley is attached to the seaboard states; while south of Virginia, where the eastern range carries the principal water parting, the Great Valley is part of Tennessee. These

water gaps, moreover, opening natural transportation routes across the mountains, furnished the early routes of migration as they still do of commerce.

As a whole, the Appalachian Highland is much lower and less continuous than the Cordilleran. It is, in fact, entirely cut through by the St. Lawrence and the Hudson-Mohawk valleys, which consequently form, together with the Mississippi, the three natural gateways to the continent. (Fig. 54.)

For this reason, and also because of the wide eastern Coastal Plain, North America commercially faces the Atlantic.

126. The Central Plain. The great Central Plain is for the most part of very gentle slope, though it does contain several minor uplands. The three of most importance are the Lake Superior uplands, the Ozarks, and the Black Hills.

This plain is moreover traversed by many large navigable rivers; while the Gulf of Mexico, the Great Lakes, and Hudson Bay in effect carry the Atlantic, to which they are tributary, into the very heart of the continent. In addition to wide expanse of fertile soil, and to wealth of minerals in its upland districts, the Central Plain thus has unusual natural facilities for commerce.

Portions of Indiana and Illinois, and most of the region west of the Mississippi River and Lake Winnipeg, were treeless when the white man came. These are the natural prairies. (Fig. 60.) The western portion of the treeless belt, beginning at the line of 2,000 feet elevation, approximately along the 100th meridian and rising to 4,000 or 5,000 feet near the Rockies, is known as the Great Plains. (Fig. 54.) Here the rivers, owing to the greater elevation, have cut deeper valleys, causing a more rolling and broken surface.

127. The Cordilleran Highland. The Cordilleran or Western Highland comprises five distinct divisions. The Rocky Mountains, carrying the Continental Divide, present a practically unbroken rampart toward the east; though a tongue of the plains in Wyoming, which determined the course of the Union Pacific Railway, does penetrate some distance into the

mountains. Beyond the Rockies lies a lofty plateau traversed by numerous lesser ranges. It is drained in part by the Colorado, Columbia, Fraser, and Yukon rivers, but also includes the Great Basin in Utah and Nevada, having no outlet to the sea. Beyond this plateau on the west rises the snow-capped Sierra Nevada-Cascade Range. Unlike the Rockies, this range is cut by several water gaps, notably those of the Columbia and Fraser rivers. Beyond this range again, upon the Pacific slope, lie several broad and highly fertile valleys, the San Joaquin-Sacramento in California, the

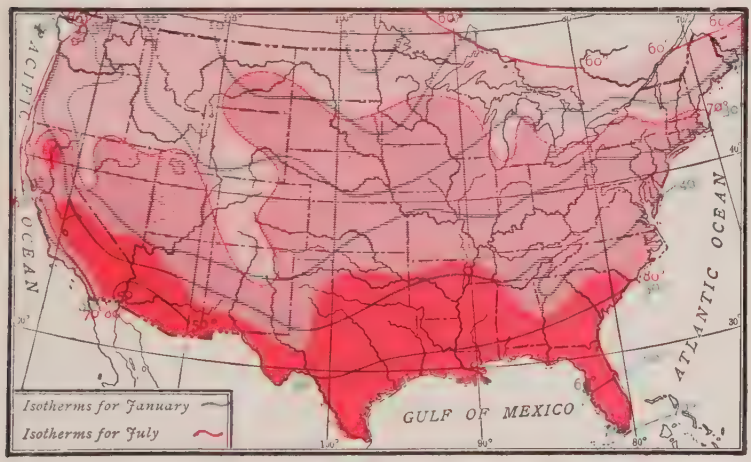


FIG. 56. *Temperature belts in the United States for July and January.*

Willamette in Oregon, and the valley surrounding Puget Sound. Finally, beyond these valleys are the Coast Ranges, which descend abruptly to the Pacific, leaving little room for a coastal plain at their base.

Taken as a whole, the Cordilleran Highland is broken by no water way, and its lowest pass is about a mile above sea level. It consequently opposes immeasurably greater obstacles to commerce than do the Appalachians.

128. The Climate of Temperate North America. North America is broadest in the Temperate and narrowest in the

Tropical zone. Nearly all of it thus has a temperate climate suitable for the white race.

Moreover, temperate North America, though divided by the accident of history between Canada and the United States, is singularly well fitted by nature to be the home of one great people; for, more than any other continent, it is a geographic unit. In general, east and west mountain ranges are temperature barriers, while north and south ranges which stand across the paths of the prevailing winds, are rainfall barriers. Owing to the north-and-south trend of the mountains in North America, there is no abrupt change in temperature anywhere between the Gulf of Mexico and Hudson Bay. The United States never could have come into existence if the Rocky Mountains ran east and west, in latitude 35° or 40°, bearing tropical jungles on their southern, and frigid deserts on their northern, slopes like the Himálayas.

From east to west, however, the temperature changes are more abrupt. The Atlantic slope, especially in New England and eastern Canada, being exposed to winds both from the land and the sea, has a very variable climate; the great interior plain is subject to extremes of heat and cold like Siberia and Russia; while the Pacific coast, where westerly winds and ocean currents prevail, has a mild, even climate like western Europe. (Fig 56.)

The rainfall likewise varies from east to west, being heavy on the Atlantic and Gulf coasts, lighter in the interior (which depends largely on the Gulf of Mexico and the Great Lakes for moisture), and heavy again on the northern Pacific slope. Between the 100th meridian and the Sierra Nevada-Cascade Range, the rainfall is in most parts insufficient for the type of agriculture found in humid regions. The continent thus has, as the French say, "the defects of its qualities;" since the north-and-south trend of the mountains, which tends to equalize the temperature over wide areas, at the same time checks the moisture-laden west winds and dooms half of the continent to a scanty rainfall. (Fig. 57.)

129. The American People. Providence winnowed from four nations the seed wherewith to plant America. This was the faith of our fathers; and certain it is that the families driven to America in colonial times by religious and political strife at home, were of exceptional character and intelligence. Some of the early English colonists indeed sought sudden riches as eagerly as the Spaniards had done; but being forced to till the soil in the absence of gold and of furs sufficient to maintain them, they founded a stable agricultural society.

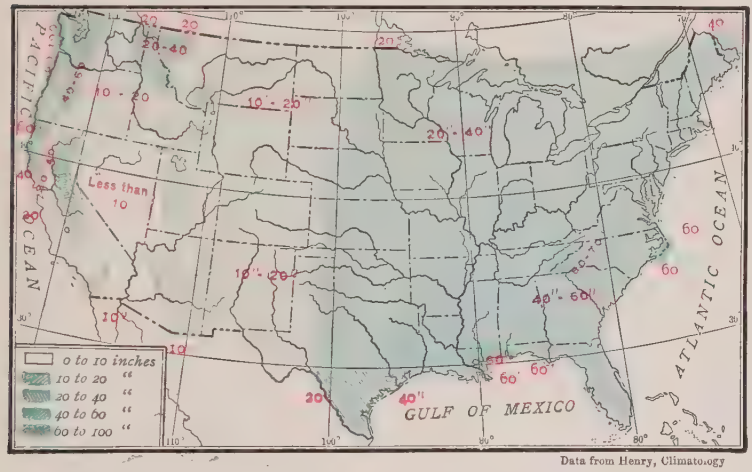


FIG. 57. *Mean annual rainfall in the United States.*

The English settlers, occupying rich farming districts, naturally increased rapidly in numbers and resources. This was the decisive fact in the long duel with France for North America.

The practice of agriculture also tended to preserve the race integrity of the English, for the hunting Indians could not be made into farm hands, nor could they long remain friends with those who, to make farms, cut down the forests and drove away the game. This hostility checked intermarriage and saved the English colonies from the fate of Spanish America. Finally, through immigration subsequent to the Revolution,

all the strong races of Europe, especially of northern and western Europe, have helped to build the American nation.

The present distribution of population in the United States (Fig. 58) illustrates in a striking manner how largely man is controlled by nature. (Figs. 54 and 57.)

130. Adaptation to Environment. There has been much loose thinking and writing about the "conquest of nature," "triumphing over nature," and so forth. The fact is that man can make use of natural forces, such as steam or elec-

After U. S. Census

FIG. 58. *The density of population per square mile.*

tricity, only on one condition—that of implicit obedience to natural laws. In the words of Lord Bacon, "Nature is conquered only by obeying her."[1] In like manner man can prosper in any part of the world only by adapting his mode of life to the resources which nature places at his disposal. Nowhere is this dependence on natural environment more striking than in the early history of the United States.

The first colonists were saved from actual starvation, until their European grains became acclimated, only by planting maize, which they obtained from the Indians. Their method

[1] *Natura non vincitur nisi parendo.*

of cultivation, it may be added, was not much more elaborate than that of the Indian squaws, who used to make a hole in the ground with a piece of wood hardened in the fire, drop in the seed, and scrape the dirt over it with their toes.

Maize, indeed, growing readily in the forest clearings made by deadening the trees, and maturing in little over three months, certainly hastened by generations the occupation of America by the white race. Moreover, it remained the chief breadstuff in the United States until far into the nineteenth century.

131. Northern and Southern Types of Agriculture. In the northern colonies men sought in vain for crops which could be sold abroad, since there was at that time no demand in Europe for grain. They were consequently forced to adopt a self-sufficing type of agriculture, aiming merely to supply their own wants. This self-sufficing agriculture produced a system of small farms worked by their owners, and consequently a democratic type of society. It moreover spread westward as the frontier advanced, and dominated the North until the railway, the reaper, and the growth of manufacturing cities in the East and in Europe made possible the cultivation of wheat for the market.

In Virginia and the more southern colonies, on the other hand, the soil and climate permitted the growth of staple crops—tobacco, rice, indigo, sugar cane, cotton—for which there was a good market abroad. The settlers consequently developed a commercial type of agriculture, demanding abundance of cheap labor. This demand was met at first by the importation of contract labor (indentured white servants), and later of African slaves. Thus arose a distinct type of industry and of society which dominated the South and played a leading role in our national history down to the Civil War.

It was this difference in natural environment (though less pronounced here than in most continents), which, by favoring different crops and different systems of farming, made the

New Englander and the Virginian, though of the same race and speech, so very unlike. The Civil War, indeed, was rooted in the very soil and climate of the continent.

132. The Early Importance of Water Ways. As the colonists came from over sea, they naturally settled first around sheltered bays or estuaries; and as their numbers increased the newcomers pushed inland along the navigable rivers. For more than a century practically all travel and transportation in America were by water.

The French, indeed, having access by the St. Lawrence and the Great Lakes to the interior of the continent, and being able by short portages[1] over the water-parting to launch their canoes again on streams flowing southward, continued to make almost exclusive use of the water ways until their conquest by the English (1763).

133. The First Overland Trails. At the head of river navigation the English were forced to abandon water transportation and strike into the mighty forest which then clothed the Appalachians. In so doing they followed Indian trails, usually based on buffalo "traces"; for the runways of wild animals commonly form the first paths through the wilderness. These paths, chosen with singular sagacity, follow valleys in the mountains but divides in plateaus or plains, for which reason they often serve the later needs of civilization.

[1]The portages of historic importance leading south from the St. Lawrence system (aside from those in New England) were chiefly the following: (1) The "Grand Pass" from Lake Champlain to the Hudson—a route trodden by many armies and sown with battlefields. (2) The Oneida Carrying Place, from the Mohawk to the headwaters of the Oswego, where Rome, N. Y., now stands. (3) From Lake Erie, at Erie, Pa., to the headwaters of the Ohio. (4) From the Cuyahoga River to the Muskingum, where Akron, Ohio, is located. (5) From the Miami to the Wabash, marked by Fort Wayne, Ind. (6) From the St. Joseph to the Kankakee, near South Bend, Ind. (7) From the Chicago River to the Illinois, at Chicago. (8) From the Fox River to the Wisconsin. (9) From Lake Superior to the Mississippi by way of (*a*) the Bois Brulé and St. Croix rivers, or (*b*) the St. Louis and West Savannah rivers to Sandy Lake, Minn. It is interesting and significant how many of these portages have furnished the sites for cities and the routes for canals. (See Hulbert, *Historic Highways*, vol. 7; Robinson, *Development of Agriculture in Minnesota*, Chap. III.)

Thus Nemacolin's Path, which Washington followed on his mission to the French (1754), was the forerunner of Braddock's Trail (1755), the National Road, and the Baltimore & Ohio Railroad. The Kittanning Path up the Juniata to the Allegheny furnished the route of Forbes's Trail (1758) and of the Pennsylvania Railroad. The Warrior's Path from the Shenandoah Valley through Cumberland Gap to the Falls of the Ohio became Boone's Wilderness Road (1769) over which Kentucky was settled. After the Revolution had broken the power of the Six Nations, the Iroquois trail from Albany

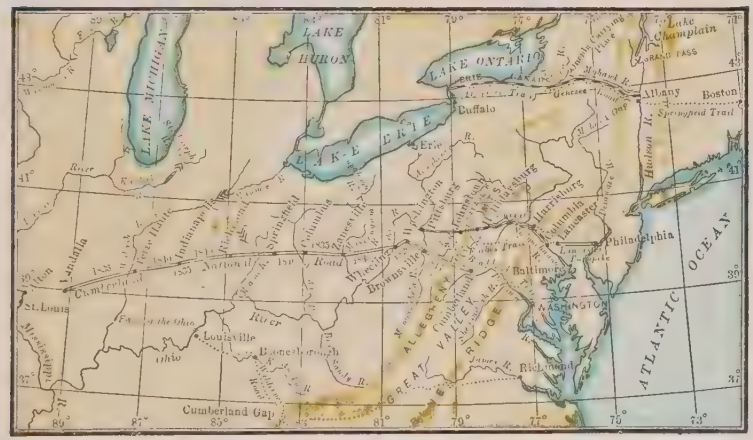


FIG. 59. *Early highways to the West.*

to Lake Erie developed into the Great Genesee Road, which is followed in a general way by the Erie Canal and the New York Central & Hudson River Railroad. These four were the first and greatest overland routes into the interior of the continent. (Fig. 59.)

The buffalo and the Indian thus blazed the way for the locomotive. This occurred not only through the Appalachians, but later through the Rockies and on to the Pacific.

134. The Bonds of Union. It was the Roman roads that bound together the Roman Empire. Only good facilities for

transportation can unite remote sections in a community of interests and of feeling. It was therefore evident, even before the close of the American Revolution, that the future of the country depended on overcoming the barrier of the Appalachians.

In spite of bridle paths and even rough wagon roads, the mountains still remained virtually impassable to commerce; the western country was consequently dependent on the Mississippi, and its mouth was held by a foreign power. In despair some men even intrigued for a transfer of the region to Spain or France. It was this situation that forced the Government, during Jefferson's administration, to purchase Louisiana (1803), and later to construct the National Road from the Potomac to the Ohio (1818).

The National Road, being broad, hard, and of easy grade, and the Erie Canal, built (1825) by the state of New York to connect the Hudson with the Great Lakes through the Mohawk Gap, thus became at once life-giving arteries of commerce and therefore the strongest bonds of union between the East and the West.

The work of unification was powerfully furthered by the steamboat (after 1811), which made upstream navigation possible; and was completed between the Atlantic seaboard and the interior by the railroad. The first continuous line of rails, beginning at tidewater on the Atlantic, reached Buffalo in 1842, the upper Ohio in 1851, Chicago in 1852, the Mississippi at Rock Island in 1854, the Missouri at St. Joseph in 1859, and the Pacific at San Francisco in 1869. Meantime the first railway from the Gulf of Mexico to the Great Lakes had been opened in 1859. The driving of the last spike on the Union Pacific thus signalized the commercial conquest of the continent.

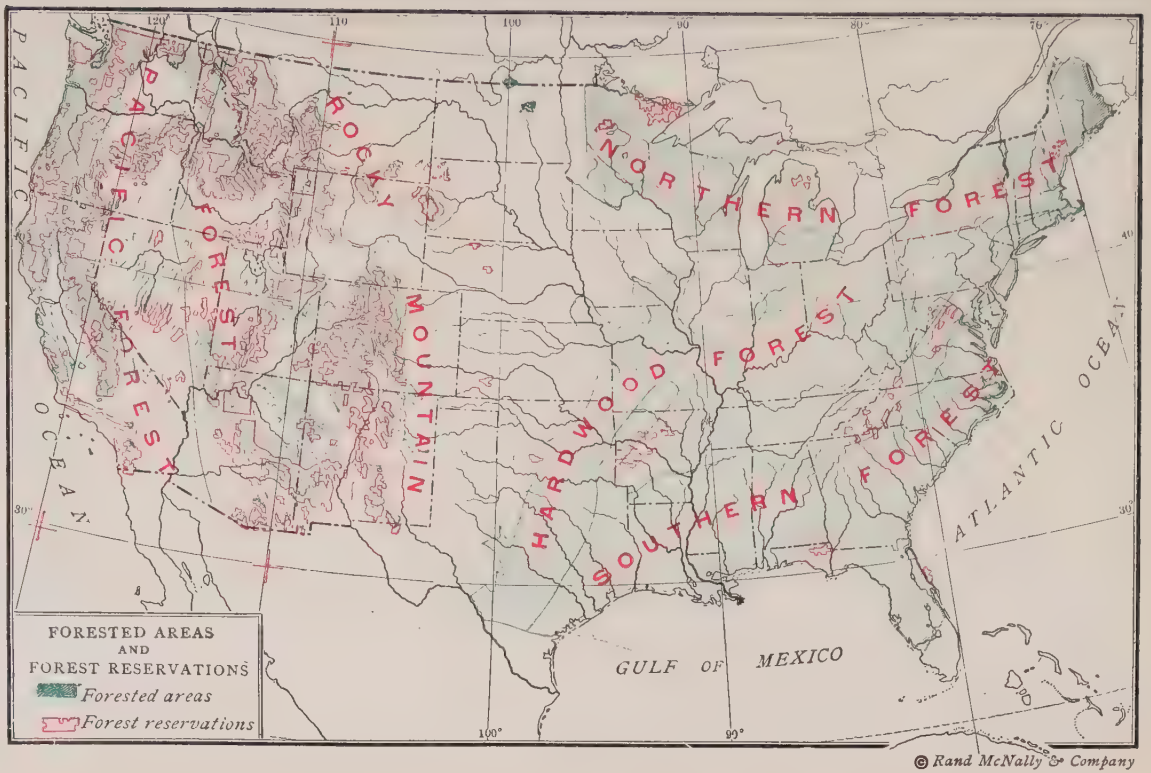
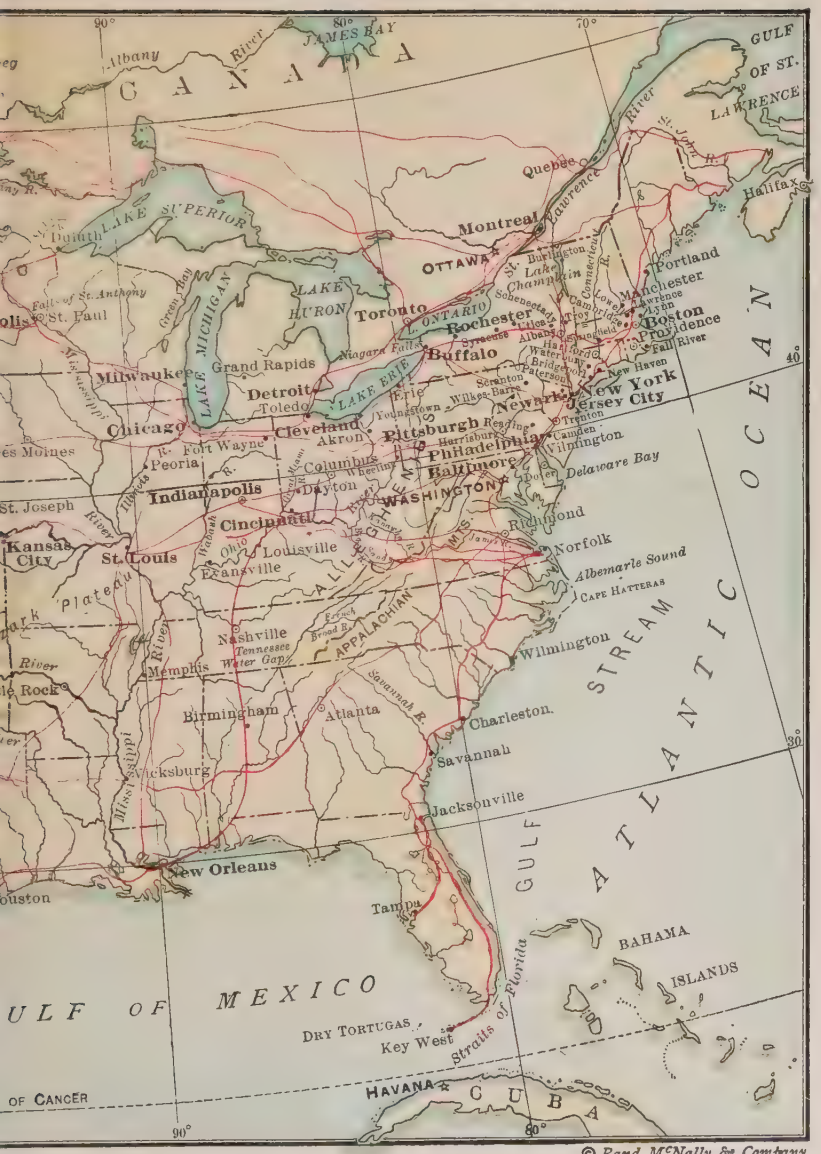


FIG. 60. *Areas originally wooded and National Forest Reserves.*

UNITED STATES
SCALE
0 50 100 200 300 400 500
360 Statute Miles to one inch
Capitals ..... WASHINGTON
Cities with 250,000 and over New York
Cities from 48,000 to 250,000 and chief cities of certain states under 48,000 ..... Louisville
Principal railways .....
DOMINION
PACIFIC OCEAN
MEXICO
VANCOUVER ISLAND
Victoria
Seattle
Tacoma
Portland
Columbia Gap
Columbia
CASCADE MTS
Willamette R.
Humboldt Bay
Mt Shasta
Sacramento R.
COAST RANGE
SIERRA NEVADA
San Francisco Bay
San Francisco
Oakland
Reno
DEATH VALLEY
Los Angeles
San Pedro Harbor
Coronado Beach
Colorado
Gila R.
Tucson
LOWER CALIFORNIA
GULF OF CALIFORNIA
SIERRA MADRE
Rio Grande
San Antonio
Fort Worth
Albuquerque
Denver
Cheyenne
Salt Lake City
Great Salt Lake
GREAT AMERICAN DESERT
GRAND CANYON
Snake River
Bolse
Butte
BITTERROOT RANGE
ROCKY MOUNTAINS
YELLOWSTONE NATIONAL PARK
BLACK HILLS
Missouri River
Yellowstone R.
Regina
Lake Winnipegosis
Lake Manitoba
Winnipeg
Fargo
Sioux Fa
Omah
Kans
Red R.
Red
Arkan
Okla
Latitude North
Longitude West from Greenwich
120°
110°
100°
40°
30°

FIG. 61. T



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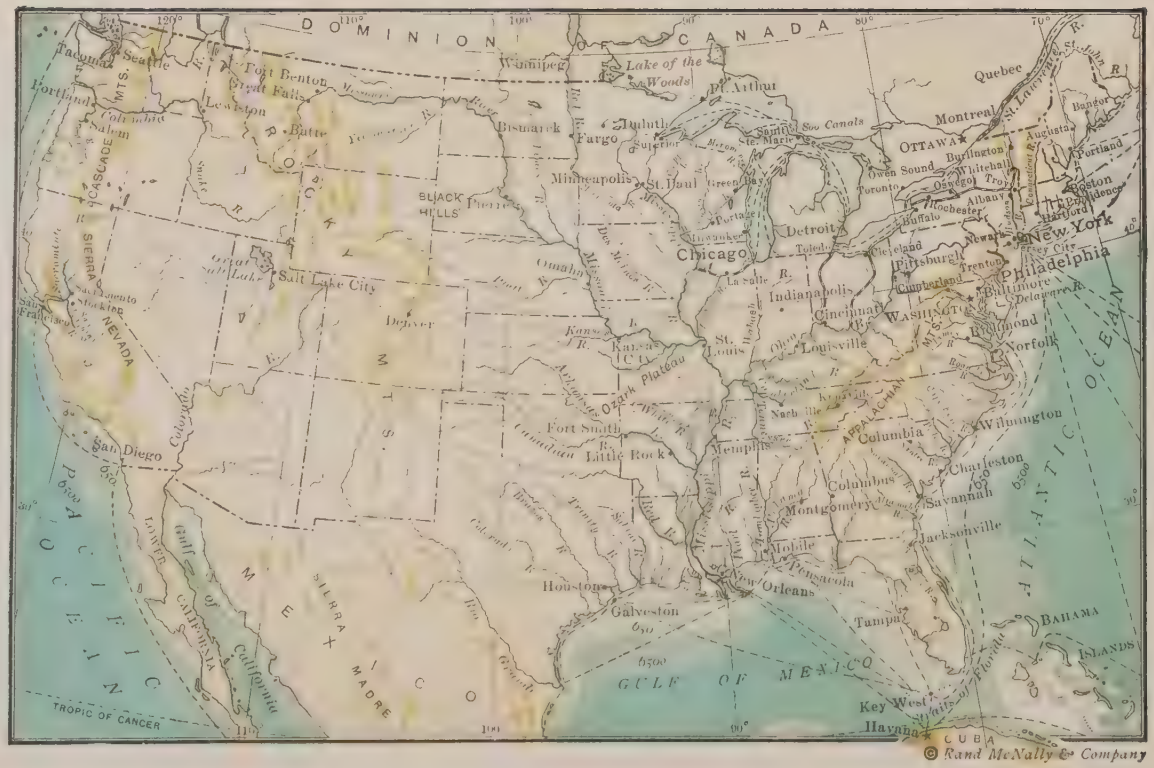


FIG. 62. *Inland water ways of the United States.*

135. Climate and Surface of the North Atlantic Section. It was not without reason that the people of New England became rugged and masterful. On such a "stern and rock-bound coast" there was no place for weaklings.

New England is an ancient mountain region worn down to the very roots by long-continued exposure to the elements, and submerged until the sea in places breaks almost against the foot of the mountains. The coast is, therefore, very irregular and the lowlands are small. The climate is, moreover, harsh—perhaps in part on account of the Labrador current which hugs the shore as far as Cape Cod.

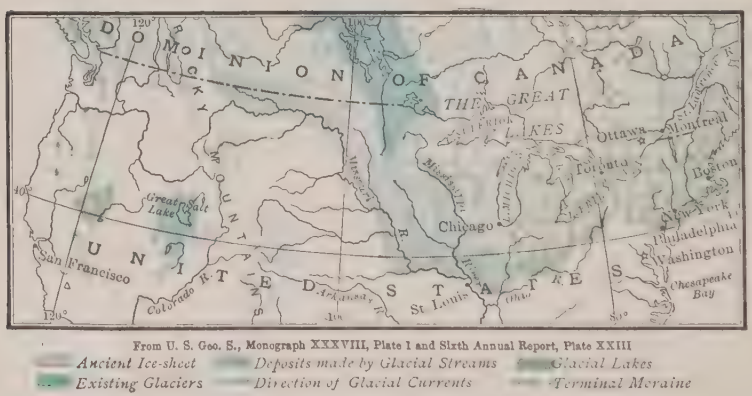
South of the Hudson, where the land has sunk comparatively little, the lowlands are larger than in New England, but the coastline is more regular and devoid of good harbors, except for Delaware and Chesapeake bays. (Fig. 61.) The climate from Cape Cod south, and also in western New York along the Great Lakes, is milder and more equable than in northern New England.

136. The Soils of the North Atlantic Section. Most of the region north of Philadelphia and the Ohio River was buried, some thousands of years ago, beneath an ice sheet so thick that it overrode the highest mountains. This huge glacier (Fig. 63) well called "a gigantic file, plow, stone-crusher, and dump cart all in one," moving slowly down from Labrador, changed the whole face of the country. It filled old river valleys in some places and scraped deep hollows in others, thereby disorganizing the drainage, causing rapids and falls in many rivers, and creating innumerable lakes. This was the origin even of the Great Lakes. Moreover, it stripped the uplands of their original soil and spread over the country a deep layer of rock waste called drift, varying from boulders the size of a house to finely pulverized "rock flour."

For these reasons hardly a third of New England, where the glacial action was most severe, is fit for the plow. But the Middle States, from the Hudson to the Potomac, having more level surface and fewer boulders, besides a milder climate, are better adapted for modern commercial agriculture.

137. Early Industries of the North Atlantic Section. Before the Revolution, the North Atlantic section (Fig. 64), like all the colonies, was essentially agricultural. The increase of population, however, early drove settlers north and west into the uplands, where the soil quickly became exhausted.

In these circumstances, the combination of timber and harbors was too plain a mandate from nature to be disregarded.



From U. S. Geo. S., Monograph XXXVIII, Plate I and Sixth Annual Report, Plate XXIII

Ancient Ice-sheet — *Deposits made by Glacial Streams* — *Glacial Lakes*
Existing Glaciers — *Direction of Glacial Currents* — *Terminal Moraine*

FIG. 63. *Glacial soils in the United States.*

The broad "continental shelf," or fringe of land but slightly submerged beneath the sea and washed by the cold Labrador current, also afforded unexcelled fishing grounds, and fish were a commodity always in demand abroad. Ship building and fishing consequently soon became important industries, and in time New England even began to compete with England for carrying trade upon the ocean.

The War of 1812, together with the Embargo Act, destroyed fleets and built factories. In other words, capital and labor were thereby diverted from commerce to manufactures.

As a result of the development of manufactures since 1812, the North Atlantic section, with only one-twentieth of the area, has more than one-fourth of the population, and produces almost half the manufactures of the United States.

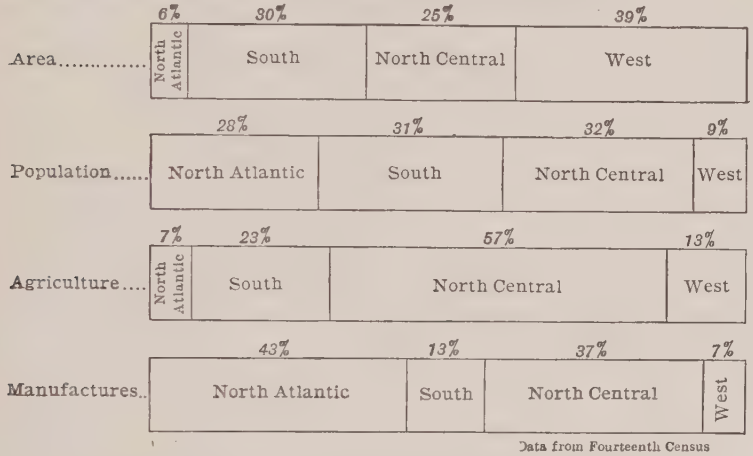


FIG. 64. *Continental United States by sections. Totals: area (not including Alaska), 3,026,789 square miles; population, 105,710,620; farm property, 77,924 million dollars; manufactures, 62,418 million dollars. For fisheries, forests, and mineral products, see Figs. 131, 132, and 139.*

138. Fisheries of the North Atlantic Section. On rocky coasts with cold climates, the "harvest of the sea" is often richer than the harvest of the land. Parts of New England, like Norway, illustrate this principle.

The deep-sea fishery (Fig. 65) in New England yields chiefly cod and haddock; the inshore fishery, herring and mackerel. All these are usually salted or smoked for market, though on the Maine coast young herring are canned in oil like sardines. Cod-liver oil is an important medicinal food. Shad are also taken in the Middle States as they ascend the rivers. In addition, menhaden are extensively caught for use as fertilizers on worn-out soils. Other important sea products are lobsters, crabs, clams, and, in sheltered waters

from Cape Cod south, oysters. The most productive oyster beds are in Long Island Sound and Chesapeake Bay. By far the most important fishery products of this section are the cod and oyster.

FIG. 65. *American Fishing Banks in Atlantic.*

The principal fishing ports are Gloucester and Boston, while the principal oyster port is Baltimore.

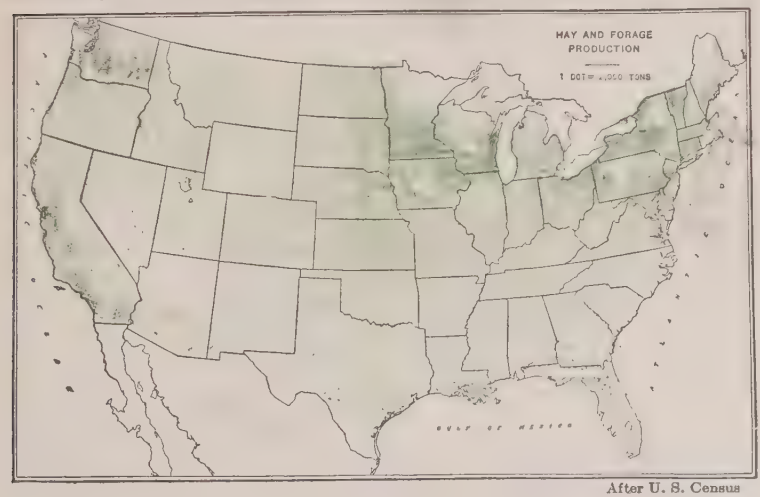
139. Forest Products of the North Atlantic Section. Lumbering still remains an important industry in northern New England, the Adirondacks, and the Alleghenies. However, white pine has become extremely scarce, the species of present commercial value being chiefly spruce and hemlock. The principal lumbering states in the North Atlantic section, measured by value of products, are Pennsylvania and New York. The leading lumber markets are Williamsport and Elmira on the Susquehanna, Burlington on Lake Champlain, and Bangor at the head of navigation on the Penobscot.

Paper, for which the modern newspaper has created an enormous demand, is made chiefly of wood pulp. The pulp mills are usually located where rivers at once deliver the timber and furnish power, for example, at Watertown near the foot of the Adirondacks. The mills of Holyoke, Mass., however,

which have the largest output of any in America, being adjacent to large centers of population, mostly use linen rags for the best quality of paper.

140. Farming in the North Atlantic Section. After the opening of the Erie Canal, and especially after the railways had reached the Mississippi Valley, the old self-sufficing type of agriculture had to be abandoned in the East. The rocky hillsides and the thin glacial soils of New England could not compete with the richer soils of the prairies in growing wheat, nor with the ranches of Texas in raising cattle. The level districts of the Middle States, where farm machinery can be used, do indeed grow considerable wheat, oats, and rye, with lesser crops of corn and buckwheat. But agriculture is in the main concerned with products other than grain, even in the Genesee Valley, which was for almost a generation (1825–1850) the granary of the country.

By reason of the moist climate, the steep slopes in the hilly districts, and the excellent markets in the cities, the dairy industry, which began about 1830 in central New York, is



After U. S. Census

FIG. 66. *The distribution of hay and forage.*

now by far the most important branch of agriculture. Near through lines of railway, milk is sent to market by special trains; in other districts it is made into butter, cheese, or condensed milk. New York State ranks next to Wisconsin in the manufacture of cheese.

Owing to the prevalence of dairying, hay is on the whole the leading crop. (Fig. 66.) Potatoes are also commonly grown in the north, especially in Maine and New York, being suited to a cool, moist climate and doing well even on rather poor soil. Special crops, cultivated intensively on limited areas, are hops, beans, cabbage, onions, and sugar beets in western New York, fruit (and fruit trees) along the Great Lakes and Chesapeake Bay, tobacco in the Connecticut Valley and along the sheltered eastern foot of the mountains from Maryland to central New York. In the lowlands near the great cities, garden "truck" or vegetables are extensively grown, to some extent under glass and with artificial heat. This is commercially possible in competition with the South, because the freight rates are high on such perishable products if shipped from a distance, and also because the returns per acre will pay even on high-priced land.

141. Industries Using Farm Products. North of the early-vegetable belt, the canning of fruit, vegetables, and oysters is a large industry, especially at Baltimore and at Wilmington, Del. Canneries are also numerous in New York State. Flour milling is important at Buffalo and Rochester and the manufacture of corn starch at Oswego, all having water power and water transportation from the West. Meat packing is carried on where land and water transportation meet, and live stock from the West must consequently be unloaded, as at all the leading seaports from Boston to Baltimore.

Industries employing in whole or in part imported materials naturally flourish near tidewater. Such are the roasting and grinding of coffee and spices at New York, likewise tobacco manufactures and the refining of sugar in all the great seaports. The largest sugar refineries are in Brooklyn.

The tobacco industry is also important in cities near the tobacco district, as Lancaster and York, Pa., and Binghamton, N. Y.

142. Why Manufactures Flourish in the North Atlantic Section. In this age of machinery the dominant factor is mechanical power. (Fig. 67.) Where the waterfalls and coal fields are, there the factories prosper and multiply.

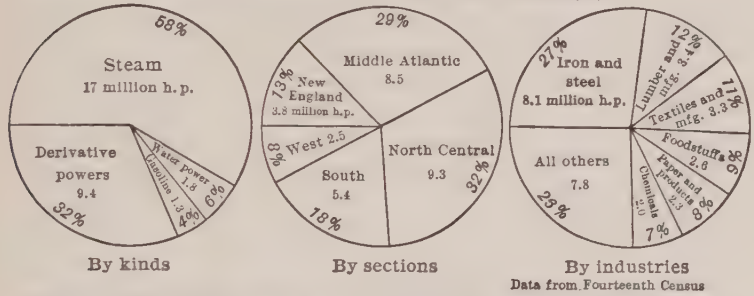


FIG. 67. *Mechanical power used in manufactures in the United States, Fourteenth Census, 29.5 million horse power. Derivative powers include electricity, and compressed air, derived from water power, steam, and gas engines.*

The rivers of New England and New York descend rapidly from considerable elevations, forming many waterfalls and rapids. Their flow is, moreover, quite constant; for the numerous lakes left by the great glacier serve as natural reservoirs, and the rainfall is well distributed throughout the year. For these reasons the rivers furnish excellent water power. At the census of 1920 about a fourth of all the power employed in New England was derived from water—either directly or through the medium of electricity—a far larger proportion than in any other section of the country. And the enormous power of Niagara (Figs. 68 and 69) may yet create in that vicinity the greatest manufacturing center of the continent.[1]

[1]Water power is also furnished in New York by other rivers flowing to Lake Ontario, as at Rochester, Auburn, Oswego, and Watertown; by streams descending from the Allegheny Plateau, as at Jamestown, Elmira, and Binghamton; and by the upper Hudson and its tributaries, as at Troy, Cohoes, and Glens Falls.

South of the Hudson there is a "Fall Line" at the inner edge of the Coastal Plain, where the ocean formerly beat against the land. These falls, affording power and usually forming the head of navigation, are marked by a row of important cities from New Jersey to Alabama. (Fig. 54.)

FIG. 68. *Long distance transmission of electric power from Niagara Falls.*

The Middle Atlantic region, moreover, abounds in underground treasures, especially coal and iron.

After the War of 1812, these mineral resources became the foundation of a great manufacturing industry and an immense commerce south of the Hudson, as water power did in New England.

143. Leather Manufactures in the North Atlantic Section The oak and hemlock forests of New England, furnishing tanbark, early led to a tanning industry. This industry, still carried on at Peabody, Woburn, and Salem, Mass., in the main has followed the retreating forests to the west and south. Chrome tannage is now extensively used at Philadelphia, the principal tanning center of the United States, especially for shoe uppers. Other tanning centers are Newark and Camden, N. J.

The manufacture of shoes by hand was established at Lynn as early as 1750, by John Adams Dagyr, a Welsh shoemaker. Until a recent date (about 1860), shoes continued to be made by hand. The industry consequently had a chance to take

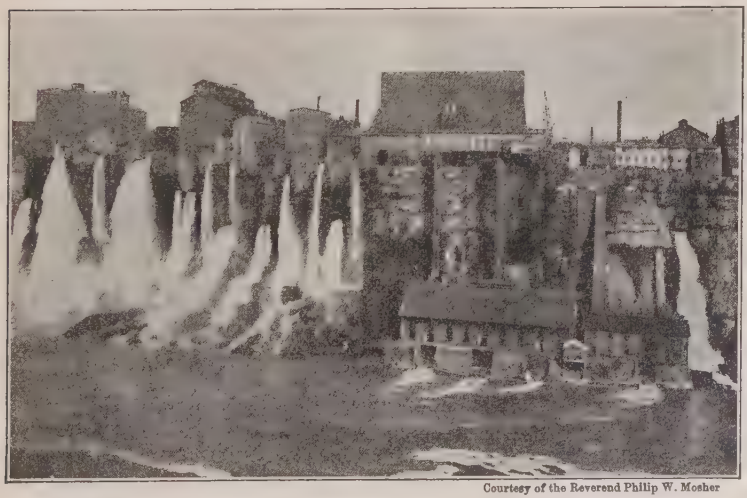
root in districts remote from water power, with the result that shoe factories in New England now use chiefly steam.

At the last census, by far the largest output of shoes was at Brockton, Lynn, and Haverhill, Mass. Other important shoe centers were Boston, Manchester, N. H., Marlboro and Salem, Mass. In the Middle States, New York City and Rochester had the largest value of product.

Leather gloves are made chiefly at Gloversville and Johnstown, N. Y., where deer skins from the Adirondacks are said to have been the original materials used.

144. Textile Manufactures in the North Atlantic Section. Cotton and woolen mills, unlike shoe factories, were originally established near water power; notably at Lewiston, Me.; Manchester, N. H.; Fall River, Fitchburg, Lawrence, Lowell, and Taunton, Mass.; Pawtucket and Woonsocket, R. I.

Steam has also built up a large textile industry in tidewater cities, where coal and raw materials can be cheaply obtained; for example, at New Bedford, Mass., Warwick and



Courtesy of the Reverend Philip W. Mosher

FIG. 69. *Water power at Niagara. Note the huge pipes leading to the power house at foot of bluff.*

Providence, R. I., and Philadelphia. New Bedford, with its steam power and ocean transportation, is the greatest cotton manufacturing city in America, if not in the world.

In woolen goods proper, Lawrence, Mass., holds first place; but in carpets the Philadelphia district, including Norristown, Pa., and Camden, N. J., is preëminent.[1] Another important district for woolens and knit goods extends through central New York, including Cohoes at the falls of the Mohawk, Amsterdam, and Utica. This district profited originally from the Erie Canal, which brought wool from Ohio, especially after the opening of the canal connecting the Ohio with Lake Erie (1832). The same district has a large output of knit goods, largely cotton.

Silk manufactures center at Paterson, N. J., the "Lyons of America," at the falls of the Passaic River and adjacent to New York, where much raw silk is imported. The industry has, however, spread to the neighboring cities of West Hoboken, Jersey City, and New York, and even throughout eastern Pennsylvania as far as Philadelphia.

The dyeing of textiles has become a separate industry at most of the great textile centers. It is a specialty at Passaic, N. J.

Rubber goods, being made of imported material, are manufactured chiefly in tidewater cities, notably Trenton, N. J., New York, also at Boston and Chelsea, Mass., and Hartford, Conn.

Ready-made clothing is turned out wherever there is cheap labor and a large market; that is, in all great cities, especially New York. Shirts, collars, and cuffs, however, are largely made at Troy; hats at Philadelphia, Danbury, Conn., New York, and Orange and Newark, N. J. These curious localizations of industries are due in the main to an early start, the consequent advantage of experience, and a class of skilled workmen. (§ 70.)

145. Mineral Industries of New England. New England lacks mineral resources of large commercial importance other than building stone. Granite, the most durable stone, is

[1] See Thirteenth Census, Vol. X., pages 903–975.

worked in many places, especially at Barre, Vt., and also at Quincy, Mass., where it is accessible to water transportation. Marble, formed from limestone by heat and pressure during the upheaval of the mountains, is quarried mainly near Rutland and Proctor, Vt.

There is also some iron ore in New England, and blast furnaces, burning charcoal, were erected in Massachusetts as early as 1702. This early iron industry in New England has left an offshoot in the manufacture of light metal wares needing little raw material but much skilled labor; for the more largely labor enters into the cost of any product, the less its localization depends on nearness to raw materials. Machine tools, for example, are made extensively at Nashua, N. H., and Worcester, Mass.; bicycles at Hartford, firearms at New Haven and Springfield, fixed ammunition at Bridgeport, clocks, bronze, and brassware at Waterbury and Ansonia, hardware at New Britain, plated ware at Meriden, watches at Waltham, jewelry at Providence. Moreover, the shipbuilding industry, now employing iron and steel, is carried on at Bath, Me., Quincy, Mass., and New London, Conn.

New England, lacking coal and therefore unable to compete in the smelting of iron, owes her continued success in metal manufactures solely to experience and skill. It is a clear case of the triumph of brains.

146. Mineral Fuels in the Middle States. The largest cities of the Middle States—New York, Philadelphia, Baltimore, Pittsburgh—owe their locations indeed to water transportation, but their phenomenal growth largely to easily-accessible coal fields (Fig. 70), which have furnished the mechanical power for manufactures.

Several valleys around Scranton, Wilkes-Barre, and Pottsville contain practically all the anthracite coal[1] in the United States. This small district (less than 500 square miles) is therefore of extraordinary commercial importance. (Fig. 70.)

[1] Value at mine in 1919, 364.9 million dollars, against 1.170 million for all the rest of the coal produced in the United States.

Along the western flank of the Allegheny Plateau lies a great field of natural gas, petroleum, and soft coal. (Figs. 70 and 71.) One seam of this coal, the Pittsburgh, is, in places, sixteen feet thick. This seam made Pittsburgh a great manufacturing city. The petroleum from around Bradford, Oil City, and Olean is mostly piped to tidewater[1] and there refined, mainly at Philadelphia and at Bayonne, N. J. The coal for iron smelting is largely coked in a wilderness of ovens around Connellsville, situated on the best field of coking coal in America.

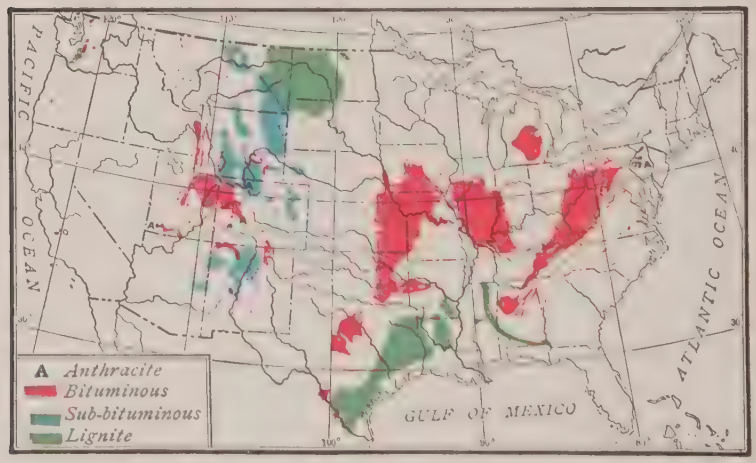
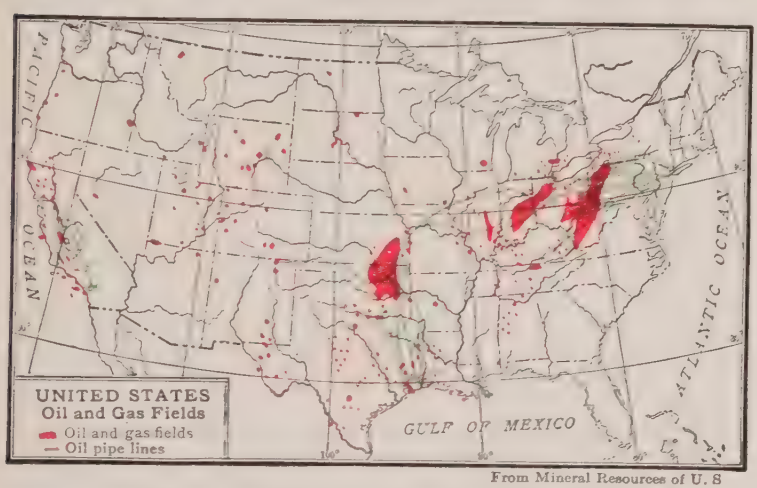


FIG. 70. *Coal fields of the United States.*

147. The Iron Industry of the Middle States. Iron furnaces, using charcoal, were early erected in New Jersey (1710) and Pennsylvania (1716); but the iron industry attained real importance only after the War of 1812. Charcoal later (about 1840) gave way to anthracite as fuel; this was in turn superseded (1875) by coke, even in the anthracite district. In each case the change occurred because the new fuel proved the cheaper.

[1]The first pipe line was built in 1865; the first line to tidewater in 1880. By 1902 there were 57,800 miles of pipe lines (Table 6), moving annually some 10,000,000 tons of petroleum an average distance of 380 miles.

Since coke has generally supplanted anthracite for smelting purposes, and the iron ores of the Middle States have proved



From Mineral Resources of U. S

FIG. 71. *Oil and gas fields of the United States.*

less profitable than the richer and more easily-mined ores of the Superior ranges, the center of the iron industry has crossed the mountains. It is now located on the upper Ohio, where Connellsville coke meets the Lake Superior iron ore landed at the Lake Erie ports. The Pittsburgh district (Fig. 72),

FIG. 72. *Steel works at Pittsburgh.*

including Allegheny,[1] McKeesport, Newcastle, Homestead, Johnstown, Pa., Buffalo, N. Y., Wheeling, W. Va., and Youngstown, Ohio, leads not only in blast furnaces but also in the production of steel rails and heavy steel goods of every description, which can be made more cheaply in the vicinity of the blast furnaces. Erie, one of the iron-ore ports, also has a considerable iron industry; while Altoona leads in railway rolling stock.

Important iron and steel works are also found in Harrisburg, Steelton, Reading, Trenton, Scranton, Allentown, Easton, Bethlehem, South Bethlehem,[2] and other cities near the anthracite deposits which once furnished fuel. Moreover, the Philadelphia district, including Chester, Pa., has immense ship yards and locomotive works. The Delaware River is indeed the American Clyde—that is, the center of American shipbuilding. Sparrow Point, Baltimore, has blast furnaces and steel mills fed with imported ores, largely from Cuba. Wilmington, Del., shares in shipbuilding and specializes in steam cars.

A third iron-working district lies along the Hudson and in central New York, where iron ores from the Adirondacks were originally employed. Albany and Schenectady now manufacture respectively cars and locomotives, the latter also producing electrical machinery. Auburn and Syracuse are the principal eastern seats of the agricultural implement industry.

148. Other Mineral Industries of the Middle States. Another important metal is aluminum, which is used for many purposes in place of brass. Being lighter and an excellent conductor of electricity, aluminum is also beginning to displace copper for long-distance electrical transmission—for example, in the Colgate power plant. It is smelted in electric furnaces, some of which are supplied with power by Niagara.

Building stone is even more extensively quarried in the Middle States than in New England. Pennsylvania holds first place in slate, limestone, and also in sandstone.

[1] United with Pittsburgh in 1906. [2] United with Bethlehem since 1910.

For structural purposes the clays of the Coastal Plain from New York to Philadelphia are also of prime importance, giving rise to a large manufacture of brick, terra-cotta, drain pipes, and pottery. Trenton, on the Fall Line, stands as the largest producer of chinaware, porcelain, and other fine pottery in the United States. Much of the finer clay for the Trenton potteries, however, is brought from a distance, some even from England. This is possible because clay comes very cheaply as ballast.

The center of glass manufacture, on the other hand, is Pittsburgh, where natural gas serves as fuel. The principal ingredient in glass, pure quartz sand, is widely distributed.

The principal binding substances are mortar and cement. Mortar is compounded of sand and lime; cement, of clay and lime. Portland cement (Fig. 73) is now so extensively manu-

27%	12%	11%	8%	47%
Lehigh District 23.5 million barrels	Illinois and Northwest Indiana 10.0	Iowa Minnesota Missouri 9.9	Pacific Coast States 6.6	All others 35.8

Data from Mineral Resources, 1915-18

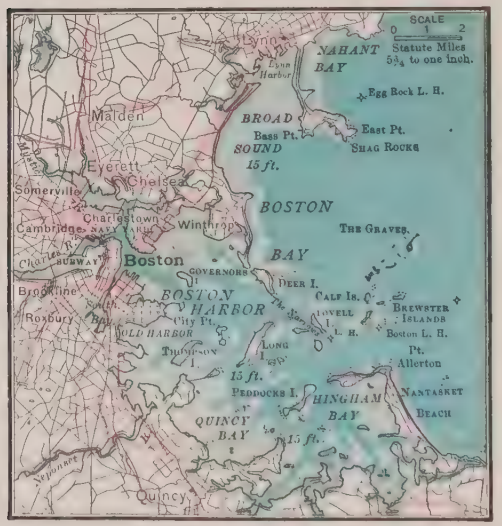
FIG. 73. *Portland cement in the United States. Total, average for five years, 85.8 million barrels.*

factured in the United States, largely in the Lehigh and Hudson valleys, that imports have almost ceased.

A belt of rock salt and gypsum deposits extends through central New York, which sometimes leads and sometimes ranks next to Michigan, in the output of salt. The salt wells near Syracuse have also given rise to important chemical industries, especially the manufacture of soda. The gypsum serves as a fertilizer, and when burned (plaster of Paris) it is used for wall plaster and statuary.

149. Seaports of New England. New England is by reason of its broken coast line the most maritime section of the country, but it labors under serious handicaps in commerce. In the first place, its ports lie farther from the interior of the continent than do New York or Baltimore. Again, it is cut off from the West by the Berkshire Hills, which compel

a climb of a thousand feet. Finally, the trend of the valleys in New England is toward the St. Lawrence; but that natural route to the interior of the continent is largely closed to commerce by the Canadian boundary. All of these natural disadvantages, however, are in a measure offset by the fact that the railways make the same rate to Boston as to New York, on shipments from the West for export to other countries.



Data from U. S. Geological Survey

FIG. 74. *Boston Harbor showing bars and islands which protect it and railways converging on harbor.*

Boston, the principal seaport (Fig. 74) of New England, is the greatest wool and leather market in the United States, owing to the large development of textile and leather manufactures in New England. Its exports, which fall considerably short of its imports in value, are principally foodstuffs from the West, which come east through either the St. Lawrence or the Mohawk valleys. As a business center Boston includes Brookline, Cambridge, and other outlying suburbs, which in effect double its population.

An eight-mile, sea-level ship canal has been opened between Cape Cod Bay and Buzzards Bay, to avoid the long and dangerous route around Cape Cod and to give an inside passage between Boston and New York.

Portland, the second port of New England, lies at the point of the Maine coast where the Atlantic comes nearest to

Montreal. It is thus the natural outlet of Montreal, that is, of nearly all Canada, whenever the St. Lawrence is icebound. The railway bridge at Quebec naturally brings Portland into equally close relations with the region north of the St. Lawrence and east of Montreal. The contract of the Canadian government with the Grand Trunk Pacific Railway provides, however, that Canadian ports—St. John, New Brunswick or Halifax, Nova Scotia—must be favored.

150. Seaports of the Middle States. Philadelphia, at the head of deep water on the Delaware, was the metropolis of the country during the Revolution. The mountains, presenting a barrier toward the west, cost it this preëminence. Moreover, the river is sometimes icebound, which does not happen at New York because of the tidal currents through East River. For these reasons the largest interests of Philadelphia are manufacturing rather than commercial, though it ranks as one of the great ports of the United States. (Fig. 75.) It is the point where the Pennsylvania railway system, extending to Pittsburgh and the West, reaches tidewater. (Fig. 12.)

Baltimore, built on the Fall Line, is likewise a great manufacturing city, and the seaport nearest to the upper Ohio Valley by way of the Baltimore & Ohio Railroad. It is also the eastern outlet of the western Maryland line, connecting with the Gould railway system which extends

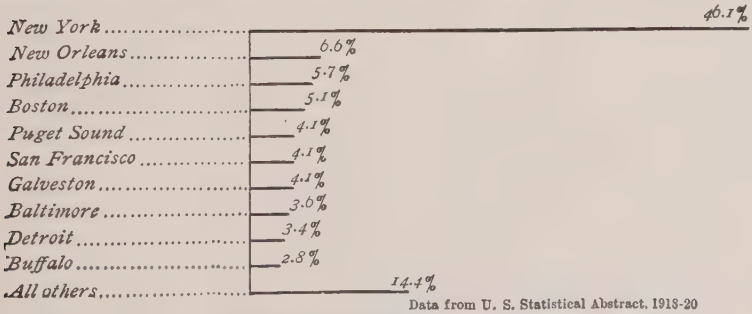


FIG. 75. *Percentage of foreign commerce of United States handled by leading seaports.*

from Pittsburgh to the Far West. Nevertheless, though the distance to the Ohio is shorter, the summit level of the mountains here is higher than farther north.

New York, at the mouth of the Hudson, occupies a site fitted, by reason of a superb harbor (Fig. 76) and unequaled ease of access to the interior, for the metropolis of the continent. Already it is the greatest commercial port in the world, and in population stands close to London. Its manufactures, including almost every conceivable article, exceed in value those of any other city in the United States; and yet New York's largest interests are commercial, rather than manufacturing. It handles nearly half of our total foreign commerce, and largely for this reason it is the chief financial center of the country. For many business purposes it includes Yonkers up the Hudson and the neighboring cities west of the Hudson—Hoboken, Jersey City, Bayonne, Newark, and Elizabeth. In fact, Hoboken and Jersey City, fronting on New York Bay, contain the terminals of many steamship lines, and several railways from the West.

Data from U. S. Geological Survey

FIG. 76. *New York Harbor, showing deep water channels, adjacent cities, and converging railways.*

New York now has several tunnels which connect Manhattan with the Jersey shore and with Long Island, where some of the railways have acquired large tracts of land for

freight terminals. Subways the entire length of Manhattan, with connection to Long Island, have also been constructed by the city to facilitate rapid transit. (Fig. 77.)

151. Canals in the Middle States. Canals were early built up the Delaware, Schuylkill, Susquehanna, and Potomac valleys, and also across the watershed between the Delaware and the Hudson. Their main service has been to carry coal from the mines to tidewater and especially to New York. At the Census of Water Transportation in 1906, however, these canals had either been abandoned, or had passed under the control of the coal-carrying railroads and were then of little practical importance. (Fig. 62.) Yet several of these canals, especially the Delaware and Raritan, could easily be made serious factors in the coal trade of New York and even of New England.

New York, unlike Pennsylvania, has retained control of its canals, which connect the Hudson with the waters tributary to the St. Lawrence, along three routes. The Champlain Canal goes by way of Lake Champlain, while the Erie Canal connects with Lake Ontario through the Oswego Canal, and also reaches Lake Erie directly at Buffalo. These canals have been toll free since 1882; and they have been deepened to

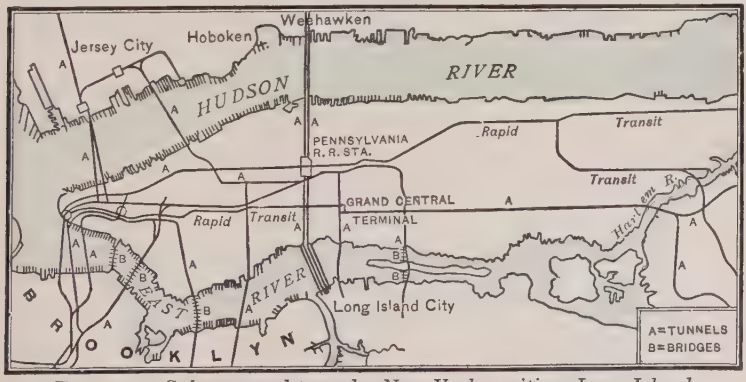


FIG. 77. *Subways and tunnels, New York, uniting Long Island, Manhattan, and New Jersey.*

twelve feet, at a cost of more than $100,000,000, so as to admit 1,500-ton barges.[1] This project was undertaken in the hope of meeting the competition of the St. Lawrence route by reducing the cost of transportation between Buffalo and New York to .25 cents per ton, or about .5 mill per ton per mile.

Finally, a coastwise canal connects Chesapeake and Delaware bays. This canal, providing an inside route for barge traffic, is likely to be replaced at no distant date by a sea-level ship canal. Besides saving distance and time, such a canal would make Philadelphia a port of call on the northern route from Baltimore to Europe.

The traffic of all these canals—even of the Erie Canal—has declined greatly in recent years. The obvious reason is that the canals are too small for modern traffic requirements. Moreover, goods must be transhipped to and from canal boats, while railway cars are hauled through to destination. Again, the railways commonly refuse to "pro-rate" or make joint through rates with canals, thereby cutting them off from through traffic. Further, the railroads control most of the coal mines which would naturally furnish the chief canal tonnage. Finally, the railroads now own most of the canals themselves and, having no interest in enlarging them, have either abandoned them or left them to decay. In these ways, the natural advantages of the Middle States for internal navigation have been largely nullified.

152. Railway Routes to the West. The finest harbor in the world would remain unused if backed by desert or by impenetrable mountains. Even with dynamite at their disposal, railways seldom penetrate mountains except along pathways prepared by running water. The rivers of the Middle Atlantic region, despite the decadence of inland navigation, thus open transportation routes into the interior of the continent.

The Potomac forms the route of the Baltimore & Ohio Railroad, which follows in part the very trail used by Washington; and the Juniata branch of the Susquehanna is closely

[1] The enlarged waterway system of central New York is now known as the New York State Barge Canal.

followed by the Pennsylvania Railroad. The north and west branches of the Susquehanna, together with the Delaware, serve still other lines.[1]

The Mohawk Gap, however, having a summit elevation at Rome of only 445 feet, against 2,161 on the Pennsylvania and 2,620 on the Baltimore & Ohio, has been the dominant factor in the commerce of the continent. It furnished the route of the Erie Canal, which built up along its course a row of cities — Albany, Troy, Cohoes, Schenectady, Utica, Syracuse, Rochester, and Buffalo—unmatched except on the Rhine. The Mohawk Gap, moreover, carries six lines of rails which cross the divide on almost inappreciable grades. The Mohawk Gap thus renders the Hudson the eastern gateway of the continent, New York the Empire State, and New York City the metropolis of the New World.

Buffalo stands at the east, as Chicago and Duluth stand at the west end of the Great Lakes route. Moreover, the railways crossing the mountains strike either the Great Lakes or the upper Ohio. Buffalo and Pittsburgh are thus the two gateways of the West.

[1]The Erie, Lehigh Valley, Lackawanna, and New York, Ontario & Western.

Maine
N Hampshire
Vermont
Mass.-Conn
R Island

New York
New Jersey
Delaware
Penn.
Maryland

West Virginia
North Carolina
South " "
Georgia
Florida

Alabama
Mississippi
Louisiana
Tennessee

Oklahoma
Nebraska

XI—THE SOUTHERN SECTION

153. The Southern People. No other section has so many people of direct Revolutionary ancestry as the region lying south of the Potomac and Ohio rivers. On the Atlantic slope, indeed, the same families have dwelt in the same counties, almost unaffected by immigration, since the days of Washington.

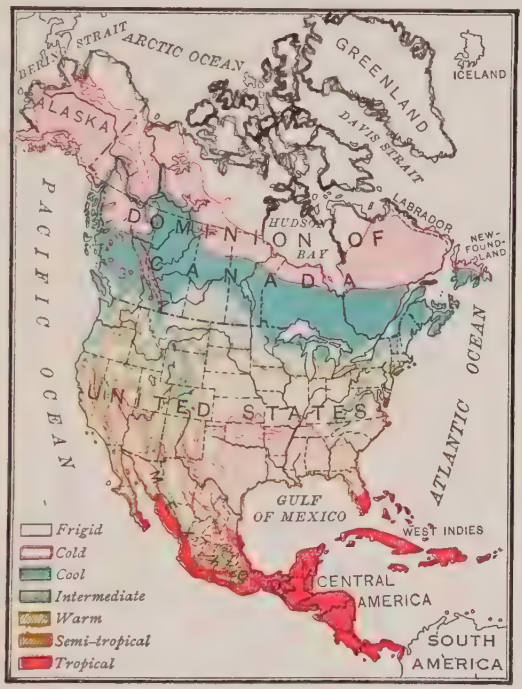
The original planters were largely English gentry, though in South Carolina the people had a dash of Huguenot blood. Louisiana and Florida also brought a considerable French and a lesser Spanish element into the Union. The uplands, on the other hand, were peopled chiefly by Scotch-Irish, who formed the fighting vanguard of civilization.

154. Surface and Soils of the South. 1. The South consists in the main of a broad coastal plain, mostly below 400 feet elevation; 2. a hilly or Piedmont belt above the Fall Line; 3. the Appalachian Highland; 4. and the lower half of the Mississippi Valley. West of the Mississippi, the Appalachian uplift reappears in the Ozarks, an outlying part of the same mountain system.

Three districts show distinct characteristics. 1. Southern Florida is underlaid by coral limestone, and barely reclaimed from the sea. 2. The Mississippi flood plain, thirty to sixty miles wide and about 600 miles long, is swampy indeed but extraordinarily fertile, like the valley of the Ganges. 3. Western Texas and Oklahoma are a part of the Great Plains.

1. The soil of the Southern lowlands is sandy near the sea; 2. but clayey in the upper part of the coastal plain. This clay belt was the original seat of tobacco and cotton culture and formed, together with the Mississippi flood plain, the famous "black belt" of the South, where negroes largely outnumbered the whites.

The soil of the Southern uplands, above the **Fall Line**, was formed on the spot by the decay of the underlying rocks, and consequently varies in character with those rocks. Thus the fertile "red lands" of the Piedmont region and the limestone soils of the Blue Grass districts around Nashville and Lexington contrast sharply with the adjacent sandstone uplands, which yield but scanty returns to the plow.



After map issued by Biological Survey, U. S. Dept. Agriculture

FIG. 78. *Life zones in North America.*

The Southern uplands, where slavery never flourished as in the lowlands, are predominantly, and in parts exclusively, white in population. For this reason, while the Old South was a tidewater South, with outlying plantations only on the richest soils of the upper country, the New South is largely an upland South, dwelling among the hills and mountains.

155. The Southern Climate. It was formerly asserted that white men could not work in the Southern fields. The truth is that native whites now grow a large and increasing proportion of the cotton; Northern men raise much of the rice of Louisiana and Texas; and Italians have displaced negroes on many sugar plantations, especially around New Orleans.

In point of fact, the South has nearly every variety of climate. (Fig. 78.) This is clearly shown by the vegetation. Southern Florida is tropical, the Gulf coast semi-tropical, the low plains warm temperate, the upper Piedmont region cool temperate, while the mountains carry into Georgia the climate of New York. Moreover, the storms of winter sweep down from the north unobstructed to the Gulf, damaging fruit, indeed, but giving to the air a tonic quality which is indispensable to maintain the vigor of the white race. (Fig. 56.)

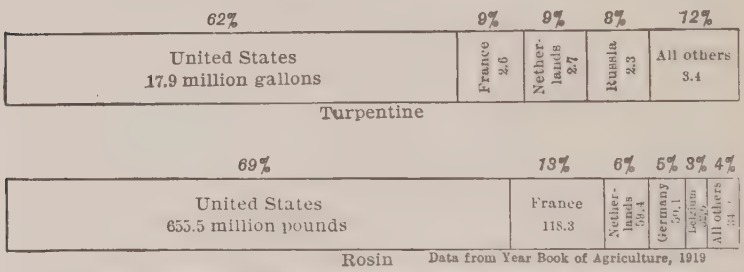


FIG. 79. *Sources of turpentine and rosin entering international commerce. Totals, averages for five years: turpentine, 28.9 million gallons; rosin, 950.3 million pounds.*

The rainfall is abundant, except in the Great Plains region, largely because the heat of the continent in summer causes an indraft of air from the sea. It is, however, less continuous than in southern China. (Fig. 57.)

156. Forest and Fishery Products of the South. The South everywhere bore noble forests when the white man came, except in the semi-arid belt toward the west.

There are three distinct belts of timber. On swampy lands along the sea and the rivers, the prevailing species is the cypress; on the sandy parts of the coastal plain it is yellow pine.[1] Both of these make excellent timber. On the Southern uplands, again, is found the largest body of merchantable

[1]A commercial name including several distinct species; chiefly the long-leaved, short-leaved, loblolly, and Cuban. Of these the long-leaved is the most important.

hard wood in the United States; chiefly oak and poplar, with some chestnut, cottonwood, gum, hickory, sycamore, and black walnut—the last named mainly in Kentucky.

The South has now displaced the Great Lakes states in the lumber industry. The principal market for hard wood is Memphis; while the chief lumber ports are New Orleans on the Gulf, and Newport News on the Atlantic.

The sap of the long-leaved pine when heated or distilled yields turpentine and rosin, used in varnishes. (Fig. 79.) Distillation of the wood itself produces tar; and tar when boiled down becomes pitch. Another product obtained from tar is creosote, employed as a preservative of timber. (Fig. 80.) All of these naval stores are now produced most extensively in Florida and Georgia. The principal market in the world for naval stores is Savannah; Fernandina ranks second in exports.

Courtesy of Forest Service

FIG. 80. *New method of turpentine orcharding which does not destroy the tree, like the deep cuts or "boxes" formerly used.*

The Southern waters abound in toothsome fish, but shrimps, oysters, and the huge green sea turtles of Florida are of more commercial importance. Still more valuable is the Florida sponge fishery around Key West, though the production is far from meeting the American demand.

157. Live Stock in the South. Hogs are raised for domestic use on most plantations. They are in part of the half-wild "razor-back" variety and forage in the woods for their living. Stock raising for market is practically confined to two

regions in the South. One comprises the upland valleys between the Blue Ridge in Virginia and the western lowlands

Courtesy of A. Clogenson, Dallas

FIG. 81. *The modern type of Texas cattle, feeding on alfalfa.*

of Tennessee and Kentucky, which raise many cattle, besides light horses and excellent mules, notably in the Blue Grass districts of Kentucky and Tennessee. The principal market for race horses in the United States is Lexington, Ky. The second stock region is the semi-arid portions of Texas and Oklahoma, which furnish pasturage for cattle (Fig. 81) and sheep. The Texas ranges were formerly occupied by Spanish cattle, with wide spreading horns and able to run like deer; but these have now been displaced by improved breeds, such as shorthorns. Cattle raising has, however, been limited by the presence of the tick, that causes Texas fever in cattle. Owing to the danger of infection there is a quarantine in Northern markets against Southern cattle until late autumn, which seriously reduces profits.

Since modern farm machinery has come into use, the slow-going ox, once generally used for farm work, has largely given way to the mule. This animal is stronger and hardier than the horse, and more at home in warm countries.

158. The Tobacco Belt. In Virginia, as in New England, the first settlers had to learn from nature how to thrive in the climate and surroundings of the New World.

The first industries of the South were those of the frontier—timber products for export, game, corn planted in the forest clearings, and stock running wild in the forests, for domestic use. This mode of life still prevails in the mountain sections, which have been happily called a "retarded frontier." There was, however, no market crop until tobacco began to be cultivated. By 1620 tobacco had become, what it remained for two centuries, almost the sole commercial crop of Virginia.

Tobacco (Fig. 82) is still the principal commercial crop of the upper South, north of the lower boundary of Tennessee, and it is cultivated to some extent in the Gulf states. Tobacco is, in fact, very adaptable as to soil and climate, but each district seems to produce a distinct quality. Thus a light yellow variety, which has brought prosperity to the uplands of North Carolina, owes its peculiar value to a thin, sandy soil long considered worthless. The United States grows and exports more tobacco than any other country. (Fig. 83.)

Hemp, another warm temperate crop, has long been grown in the Kentucky Blue Grass region, especially around Danville.

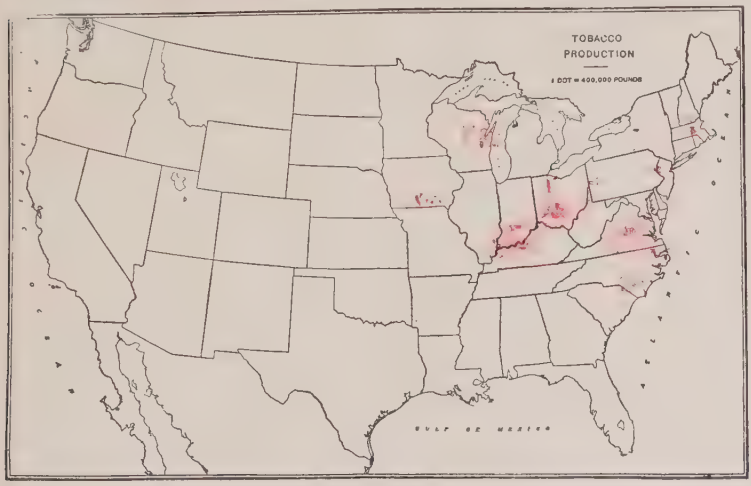


FIG. 82. *The distribution of the tobacco crop.*

In other sections of the country, this crop has almost disappeared, because of the lack of labor-saving machinery for separating the fiber from the stalk. Now, however, successful hemp brakes are coming into use, especially in Europe.

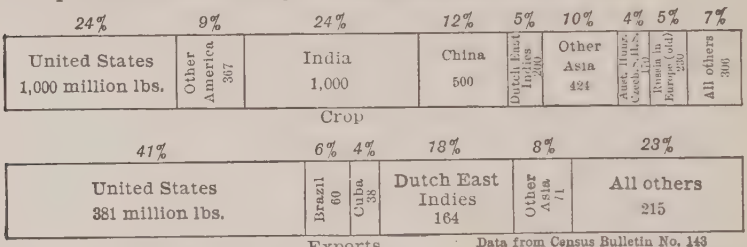


FIG. 83. *Tobacco industry of the world. Totals, averages on pre-war basis (million lbs.): crop, 4,197; exports of raw tobacco, 929.*

159. The Cotton Belt. After the invention of the cotton gin (1793) for separating the seed from the fiber, cotton rapidly forged to the front as the staple Southern crop.[1] Completing what tobacco had begun, it firmly established in

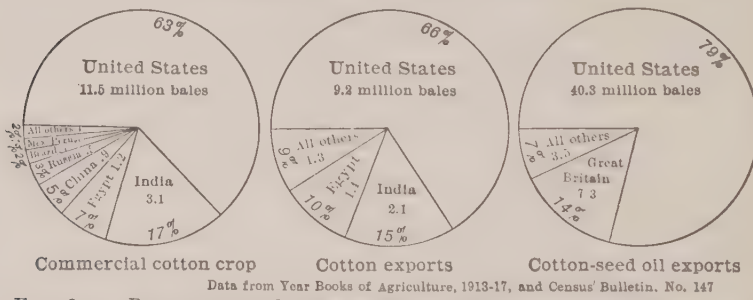
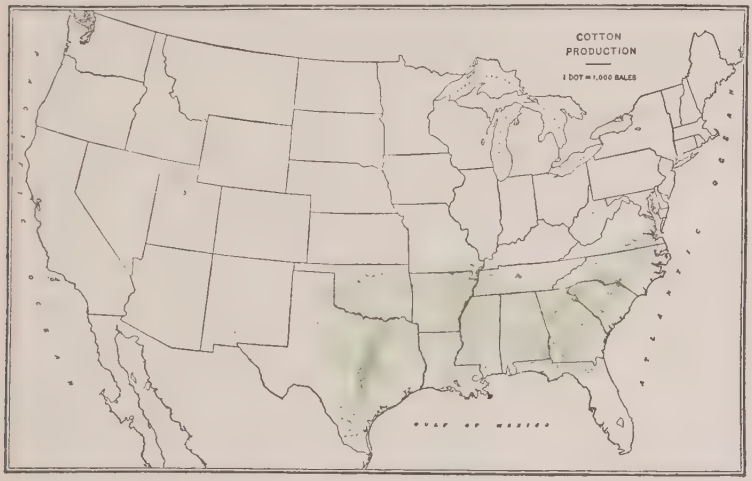


FIG. 84. *Raw cotton and cottonseed oil. Totals, averages for five years: commercial crop, 18.3 million bales; exports, 14 million bales; cottonseed oil exports, 51.1 million gallons.*

the South the plantation system of agriculture, employing slave labor, and created an aristocratic type of society based on the possession of land.

[1]In 1790, before the gin was invented, the total cotton crop of the United States was 2,000,000 pounds; in 1800, it was 40,000,000 pounds; in 1810, 80,000,000 pounds; in 1820, the year of the Missouri Compromise, 160,000,000 pounds.

In the section known to history as the lower South, south of the southern line of Tennessee, cotton is still King, exceeding in value every other Southern crop. (Fig. 85.) Cotton also prevails on the lowlands as far north as Virginia. A long summer with abundant moisture is necessary for cotton growing; and nearness to the sea greatly improves the length and fineness of the fiber. Some long-fibered sea island cotton is grown along the Atlantic; but the bulk of the American cotton crop is short fibered, known commercially as "upland." The United States is still by far the largest producer and exporter of raw cotton and cotton-seed products. (Fig. 84.)



After U. S. Census

FIG 85. *The distribution of the cotton crop.*

The limitation on the acreage that can be farmed in cotton is the necessity of picking cotton by hand: that is, a man can cultivate more cotton than he can pick. If the pneumatic picking machine could be perfected it would consequently work a revolution not less profound than that which followed the introduction of the cotton gin. (Fig. 86.) Ceasing to be indispensable on the farms, the negroes would then more than ever drift to the cities, while the large plantations would be reëstablished with modern machinery and white labor.

Courtesy of A. Clogenson, Dallas

a. By hand

Copyright, 1906, by A. Clogenson

b. By machinery. The machine operates by suction and is run by gasoline.

FIG. 86. *Picking cotton.*

160. The Rice and Sugar Belt. On the low, hot coast lands rice and sugar are the prevailing crops.

Rice held a position in South Carolina during colonial times (after 1694) corresponding to tobacco in Virginia; but floods, caused by deforestation in the mountains, have in recent years wrought havoc in the rice fields along the Atlantic.

When rice culture spread to firm, well-drained prairies in eastern Texas and southern Louisiana, to which water is raised by steam pumps for irrigating purposes, the self-binding reaper and steam thresher replaced the sickle and flail (1885). (Fig. 87.) Nothing so revolutionary had happened in rice

Courtesy of Northwestern Miller

FIG. 87. *Finished rice threshing in Louisiana. Compare with Fig. 204.*

culture in 6,000 years. Using such machinery, one man produces sixty-four times as much rice as a laborer in India.[1] As a result, more than nine-tenths of the rice crop in the United States is now grown in this district. It is estimated that the land in the lower South which could be easily irrigated (3,000,000 acres) would yield five times our present consumption of rice. The development of the industry is, however, retarded by the charges of the middlemen. Rice that nets the farmer a few cents per pound costs the consumer several times as much, becoming thus a luxury.[1]

For a century (since 1795) sugar cane has been a leading crop in Louisiana. Though it demands for success in this

[1]American Economic Association *Proceedings*, 1904.

latitude an immense expenditure of capital, the industry has now spread along the whole Gulf and South Atlantic coast, though Louisiana still has by far the largest output of sugar.

161. Other Southern Crops. Throughout the South corn is the principal crop for local consumption, rivaling cotton in acreage. Corn bread and pork are the staple foods of farm laborers. Winter wheat and oats are also grown in the Appalachian uplands, and in the "black-waxy" region of central Texas and Oklahoma, where they divide the soil with cotton.

The winter grains have a double advantage in the South, compared with corn; they do not require attention during the season when cotton must be cultivated, and they protect the soil from erosion during the winter. For this reason they are grown to some extent even where their yield is very light.

In many parts of the South, especially in the Atlantic Coastal Plain where the Gulf Stream flows close inshore and the mountains fend off the blasts which blow from the interior in winter, early vegetables and sweet potatoes are largely planted for the northern market. In the Piedmont region and the Ozarks, peaches and other tender fruits are also extensively grown at moderate elevations, especially in Georgia; while along the mountain side runs a pippin (apple) belt, rising from 1,200 feet elevation in Virginia to 3,000 in South Carolina.

That such perishable products can be grown commercially so far from the market is due altogether to special fast trains and special cars, equipped to maintain an even temperature, summer or winter. But the isolated farmer, deciding by guess what to plant, necessarily suffers frequent and heavy losses from overstocking the market; and he is, moreover, always at the mercy of the middlemen. This situation has given rise, in most of the older fruit and trucking districts, to growers' coöperative associations which employ expert agents to oversee the shipment and market the crops.

Peanuts occupy considerable land as far west as Texas, though Norfolk, Va., is the leading market. They yield an

Courtesy of Pinehurst Tea Gardens

FIG. 88. *Picking tea at Summerville, S. C.*

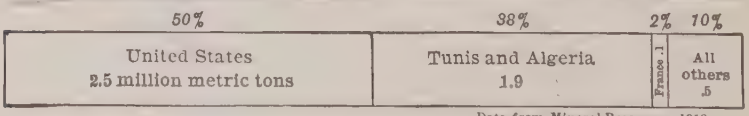
oil now extensively eaten as "peanut butter." The pecan (a native nut), figs, and even dates are increasingly grown, especially in Texas.

Florida ranks first in the production of grapefruit, and orange culture has long since recovered from the killing frosts of 1895. Large quantities of pineapple are also produced. South of Miama the coconut, mango, and banana reach maturity.

Successful experiments have been made in the raising of camphor trees in Florida, and of tea (Fig. 88) at Pinehurst, S. C. It is not impossible that the tea industry has a great future on the warm and moist Atlantic slope, which closely reproduces the climatic conditions of southern China.

162. Mineral Products of the South. Ancient pits and tunnels overgrown by the forest show that mica was mined in North Carolina by the Mound Builders, and the veins are not yet exhausted. The lead deposits of Virginia furnished bullets for both the Continental and Confederate armies; and the gold fields of North Carolina and Georgia had their day of excitement before the rush to California (1849).

On the whole, however, the Atlantic slope is noted for the variety rather than for the value of its mineral products. Those of real commercial importance comprise iron, along the western flank of the Blue Ridge; copper, especially in eastern Tennessee; vast prehistoric-bone beds, yielding phosphate of lime, which extend from Tennessee through the Carolinas into Florida; finally, granite, slate, and marble, the last named being quarried around Tate, Ga., and Knoxville, Tenn. Florida



Data from Mineral Resources, 1918

FIG. 89. *Phosphate-rock production of the world. Total, average for five years, 5.0 million metric tons.*

leads in the production and export of phosphate (Fig. 89); Georgia ranks next to Vermont in the production of marble.

Coal occurs east of the Appalachians only in small beds of late (Triassic) origin; but to the westward it underlies large areas in the Allegheny-Cumberland Plateau, the Ozark region, and the Gulf Plain. With coal are associated in places natural gas, petroleum, and asphaltum, which is used for asphalt pavements. The most productive oil field in the United States is now southwestern Oklahoma, Texas, and Louisiana. (Fig. 71.)

In Louisiana there are beds of rock salt 1,765 feet thick; also important deposits of sulphur, which is dissolved by hot water and then raised by forcing hot air to the bottom of the well. By virtue of these deposits, the United States now rivals Italy in the production of sulphur. (Fig. 90.)

Data from Mineral Resources of U. S.

FIG. 90. *Sulphur production of the world. Total in 1919, 1,517 thousand metric tons.*

Finally, in western Texas, which touches the Rocky Mountain region, there is a considerable output of mercury and of silver. These have given rise to a smelting industry at El Paso, using petroleum as fuel.

163. Manufactures in the South. The South is still in the main a farming community; but a rapid development of manufactures is in progress, based on the conjunction of coal, water power, and raw materials.

Southern manufactures are mostly concerned with raw materials of local origin on which freight charges would be high if shipped any great distance. Examples are: lumber along the rivers which penetrate forested areas, notably at Little Rock, Ark., Mobile and Montgomery, Ala., Jacksonville, Fla., and Wilmington, N. C.; phosphate fertilizers at Charleston, S. C.; leather goods at Dallas, Waco, and San Antonio, and packing-house products at Fort Worth, all near the Texas ranches; and sugar refining at New Orleans, in the midst of the cane fields which are largely near the river.

Excellent tanning materials are at hand in the chestnut oak, producing tan colors, and in palmetto roots. One of the centers of chestnut-oak tanneries is Louisville, where hides were perhaps obtained originally from Cincinnati packing houses.

The manufacture of cotton-seed oil and cake is carried on at many points in the cotton belt, notably at Memphis, Tenn., and Houston, Texas. The cake serves either as a fertilizer or as food for stock. (Fig. 47.) Outside the cotton belt and in the uplands, flour milling and furniture making are important industries, especially at Nashville, Knoxville, and Chattanooga in the Great Valley, and at Roanoke, Va., and High Point, N. C. Flour is also a leading product at Fort Worth, in the Texas black-waxy belt, where wheat is a leading crop.

The tobacco industry is largely localized in a few districts. The Cuban district includes Key West and Tampa, where Cuban tobacco is landed. Others are in the tobacco belt, notably at Louisville, which is the leading tobacco market; at Covington and Newport across the river from Cincinnati; at Richmond and Petersburg, Va.; and at Winston-Salem and Durham, N. C.

The two fundamental industries, however, for which the South would seem to have unique advantages, are cotton and

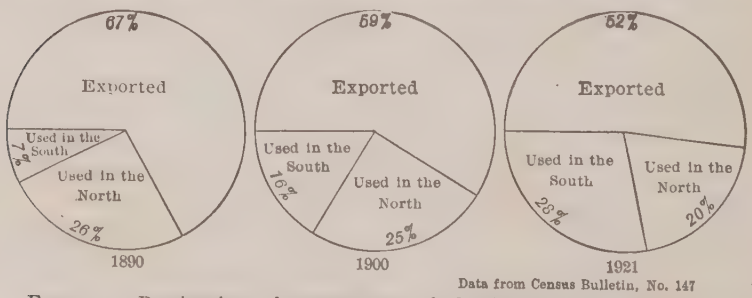
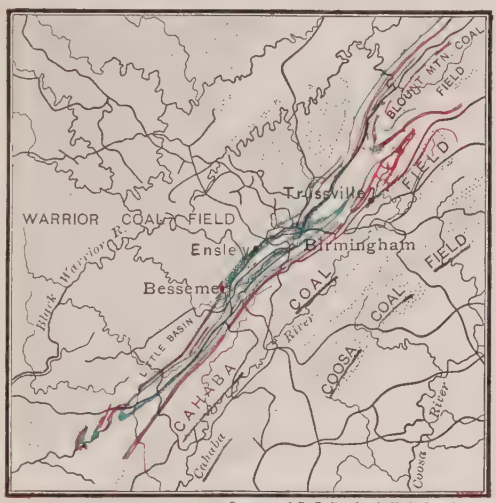


FIG. 91. *Destination of cotton crop of the United States, showing increased domestic consumption, especially in the South.*

iron manufactures. Cotton mills were first established along the Fall Line, where water power and in some cases water

transportation were available, as at Columbia, S. C., Augusta and Macon, Ga. The cotton industry has now spread to other cities such as Raleigh, Charlotte, and Winston-Salem, N. C., and Atlanta, Ga., which are close to the coal fields and can draw their labor from the sturdy white population of the uplands. So great are the advantages in the South that the proportion of cotton consumed in Southern mills has largely increased. (Fig. 91.) North Carolina, South Carolina and Georgia, now rank next to Massachusetts in cotton manufactures.

The iron industry is established at a number of points in the Allegheny-Cumberland coal field, notably at Wheeling, W. Va., and Birmingham, Ala. Now that phosphorus, which is rather abundant in Alabama ores, can be removed by the open-hearth basic process (§119), and some architects prefer open-hearth steel for structural purposes, the Birmingham district, where iron, coal, and limestone lie side by side, has become the Pittsburgh of the South. (Fig. 92.)



Courtesy of E. F. Burchard, U. S. Geo. Survey

Clinton iron ore *Limestone and dolomite*

FIG. 92. *Alabama coal and iron region.*

164. Commercial Centers of the South Atlantic Region. The Appalachians rear a higher and more continuous front south of the Potomac, being crossed by only four railroads in over 500 miles. These roads, moreover, have difficult grades. The two slopes of the Appalachians, therefore, face commercially in opposite directions.

On the Atlantic slope, one trunk line of railway roughly parallel with the coast traverses the plain just below the Fall Line, and another skirts the Blue Ridge, both crossing the Potomac at Washington. A third line follows the Great Valley west of the Blue Ridge, which offers another natural route from Philadelphia and New York to New Orleans.

Three of the railways crossing the mountains converge at the mouth of the James River. Newport News and Norfolk are consequently not only the natural outlets of Virginia and parts of North Carolina, but they are likewise the Atlantic seaports of Cincinnati and Louisville. They are also important in the coal trade. The fourth railway across the Appalachians, along the French Broad River, connects (since 1880) Knoxville and Charleston.

Atlanta, however, standing opposite the first easy passageway from the coast to the Great Valley, is well named the "Gate City of the South," being at the crossing of the main roads which traverse, and those which parallel, the mountains. Knoxville and Chattanooga in the Great Valley are in turn the focal points of lines from the west and north which enter through Cumberland Gap, the Tennessee Water Gap at Chattanooga, and other depressions in the mountain rim.

South of the Chesapeake the land dips very gently beneath the sea and the coast is lined with sand bars. The river mouths, drowned by a slight sinking of the land, form practically the only approaches to the land, and even these need frequent dredging to admit large vessels. The rivers are, moreover, shorter and shallower than farther north, because the eastern range of the Appalachians here carries the main water-parting. Conditions are, therefore, not favorable for water transportation; and several important towns are found not on the sea coast, but along the Fall Line at the inner margin of the Coastal Plain. However, the barrier beaches, the Chesapeake and Delaware Canal, and two canals connecting Chesapeake Bay with Albemarle Sound, provide sheltered coastwise navigation for small vessels from Philadelphia

almost to Wilmington, N. C. Another stretch of sheltered waters extends from Savannah, Ga., to Fernandina, Fla.

In the region south of Cape Hatteras, the leading seaport is Savannah, located where the broad curve of the shore carries the ocean farthest into the land, and where the trunk line through Chattanooga and Atlanta reaches the sea. Where the railways meet, the shipping gathers also.

165. Commercial Routes and Centers of the Gulf Region. Thomas Jefferson declared any foreign nation holding the mouth of the Mississippi to be "the natural and necessary enemy of the United States;" for it is the natural outlet by water of nearly half the country. The lower Mississippi, being ice free and of ample depth, is still a great artery of commerce. Its tributaries penetrating the Allegheny coal field are also of commercial value. Especially is this true of the Tennessee, now navigable to Knoxville, Tenn.

FIG. 93. *New Orleans Harbor, showing the location with reference to Lake Pontchartrain (the original port of the city), the delta, and the routes of canals and railways.*

The eastward drift of traffic by rail in the North, after the Civil War, tended to rob even the Mississippi of its old importance, and to check the growth of all the Gulf ports. Nevertheless the Mississippi Valley affording a broad and level field for railway construction, is clearly the line of least resistance

from the South Central region to tidewater; and in recent years the Gulf ports have all advanced with rapid strides.

New Orleans, commanding the southern gateway of the continent, is naturally the metropolis of the South and is the second port of the United States, measured by the value of its exports and imports. (Fig. 93.)

Galveston, lying at the head of the Gulf, is the commercial outlet of Texas and the Southwest as far as Denver. Though built on a sand bar and overwhelmed by the sea in 1900,

Copyright by Underwood & Underwood, N. Y.

FIG. 94. *Florida East Coast Railway bridge at Key West, Florida.*

Galveston has raised its foundations and built a sea wall against future assaults of the waves. It is one of the leading ports in the export of cotton, and can look forward to a great future.

In like manner Mobile and Pensacola are the natural outlets on the Gulf of the coal and iron districts around Birmingham, and, in fact, of the eastern Mississippi Valley as far as Cincinnati. Mobile in particular has profited largely from the increase of commerce with Cuba and Central America, importing tropical fruits and woods, sisal hemp, and even

Cuban manganese for the steel works along the Great Lakes. It is at the head of tidewater navigation in the eastern, as Galveston is in the western, part of the Gulf; and commerce in heavy commodities seeks inlying ports.

Tampa stands on the only deep-water harbor for hundreds of miles, and near large deposits of phosphate. It also handles considerable Cuban traffic for the Atlantic slope.

Key West is connected with the mainland at Miami, Florida, by a railway extending over a line of coral islands and has a large mail and passenger traffic, with outlying ports. Key West is the most southerly city in the United States, but a step from Havana. It is, in fact, the farthest outpost of the United States toward the West Indies, Central America, and the Panama Canal. (Fig. 94.)

A bridge across a great river attracts commerce much like a gap in the mountains, since a train ferry is always a slow and unsatisfactory substitute. For this reason Memphis, standing on a bluff which the river closely approaches, and which serves as an abutment for the southernmost bridge on the Mississippi, has become a great railway center.

Other points where railways converge are Louisville, at the Falls of the Ohio, which forms one gateway toward the north; and El Paso, at the gap cut by the Rio Grande in the Rockies, which is the southern gateway toward the Pacific. Louisville is the second city of the South. For many business purposes, moreover, it includes New Albany and Jeffersonville across the Ohio.

The Panama Canal is giving new life to every industry and every harbor in the South — above all to New Orleans — and likewise to every city on the Mississippi from St. Paul to the Gulf. Much commerce that formerly moved east or west is going south; still more commerce will be created by the fact of cheap transportation to the west coast of America and to the Orient. The South now lies on one of the main world thoroughfares.

Wis. Missouri
Minn. Ill.
N. Dak. Indiana
S. D. Ohio

XII—THE NORTH CENTRAL SECTION

166. The People of the North Central Section. The North Central section, comprising the states north of the Ohio and west to Colorado, is to-day the heart of the Republic. (Fig. 64.) The population, originally drawn from the best stock of the older states, has been augmented from many sources. Despite this diversity of origin, the uniformity of the land and the wide reach and unbroken horizon of the prairies have not failed to leave their impress on the people. Nowhere else are the democratic traditions of American life so well preserved.

167. The Climate of the North Central Section. The climate is of the extreme continental type, with hot summers that rapidly mature the crops, and cold winters that not only pulverize the soil, but also maintain the physical vitality of the race. (Fig. 56.)

As one goes west beyond the line of twenty inches rainfall, the country is increasingly given over to pastoral pursuits except where irrigation is possible. (Fig. 57.) In recent years, however, some progress has been made in developing a type of farming suited to semi-arid conditions. (§196.) In this semi-arid belt a decrease of a few inches more in the rainfall would cause even the grass to disappear, and with it the herds, leaving only desert solitudes.

168. The Soils of the North Central Section. North of the Ohio and Missouri, which probably cut their valleys when flowing along the edges of the great ice sheet,[1] most of the soil is of glacial origin (§136). It is consequently rough and rocky where the front of the glacier long stood, coarse and gravelly where strong currents flowed, and composed of fine clay or of loam where the currents were checked. Thus the clay soil of the Red River Valley, which grows splendid wheat, was deposited as sediment in glacial Lake Agassiz.

[1]Mill, *International Geography*, p. 744.

As in New England, there are large tracts toward the north better suited for forests than farming. As a whole, however, the section has a larger proportion of fertile land than any other in the United States. Moreover, the glacial soil, containing rock waste of many kinds and numerous pebbles which furnish plant food as they slowly decay, is not so easily exhausted by tillage as residual soils. For fifty years this part of the United States has therefore been the granary of the modern, as Egypt was of the ancient, world.

169. Furs and Fish. In the forested regions along the lakes, just as in northern Maine and in the southern Appalachians, we find a "retarded frontier"—that is, a section where frontier conditions and modes of life still prevail. Settlers are, however, rapidly pressing on, clearing away the wreck left by the axe of the lumberman, and with infinite labor opening farms in the wilderness. The present generation will witness the final disappearance of frontier conditions wherever the soil is fit for farming.

In the meantime the trapping of fur-bearing animals, that characteristic frontier industry, is still carried on within these forested districts. St. Louis and St. Paul, both early stations for the fur trade, are still important primary markets for furs.

The fisheries of the Great Lakes and Mississippi River system support a considerable population living on rocky and sandy shores that afford no other means of support. The most important lake species are whitefish, salmon trout, and sturgeon. Refrigeration enables the fish to be consumed fresh in all parts of the section.

170. The Forests of the North Central Section. In the eastern and southern part of the North Central region, some scattered hard-wood groves remain, consisting chiefly of oak. In addition there is some ash, which commonly serves for parts of tools; basswood, used for small wooden wares; birch, employed for furniture; and maple, used for floors. St. Louis and Cincinnati are important markets for hard-wood lumber.

Courtesy of Northwestern Miller

a. Ancient method—Arabs in Algeria cutting grain with sickles.

Courtesy of International Harvester Co.

b. First American improvement—the grain cradle.

Courtesy of International Harvester Co.

c. Second American improvement—the self-binding reaper.

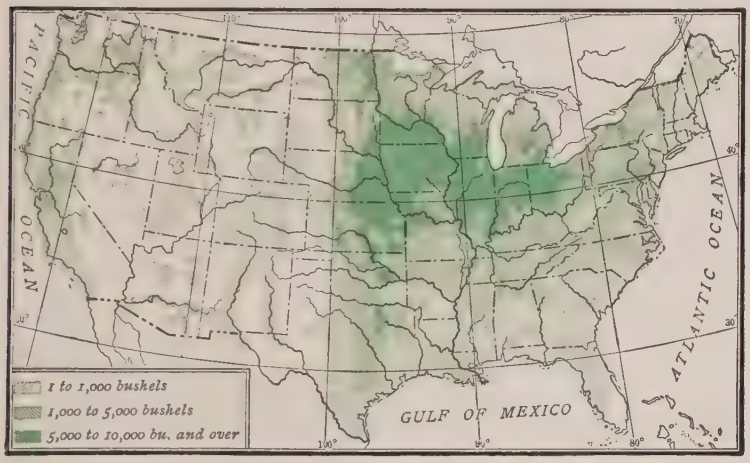
Courtesy of Parlin & Orendorff, Canton, Ill.

d. Third American improvement—horseless agriculture, reaping, plowing, and rolling at one operation.

FIG. 95. *Evolution of grain harvesting.*

From central Michigan north and west to the Red River Valley there were originally magnificent forests of white and Norway pine, with some hemlock, spruce, and other varieties. In this section, as in Maine, the frost and snow of winter, which transform marsh and stream into ideal roadways, have made lumbering both cheap and rapid. For this very reason, in part, the forests are now approaching exhaustion.

171. Grain Crops in the North Central Section. To the early settlers, fresh from the rocky hillsides of New England, these broad fertile prairies seemed indeed the Promised Land.



After U. S. Census

FIG. 96. *Yield of all grains per square mile.*

Grains flourished here as they had never done on the eastern uplands. The level prairies, moreover, afforded a fair field for the great inventions in the line of farm machinery, such as the mower (1834), reaper, and thresher, which have revolutionized agriculture not less suddenly and completely than manufactures have been transformed by steam and electricity. (Fig. 95.) Vergil would have found little new on an American farm a century ago; to-day there would be little that he could understand. Grain thus became for the North Central region very nearly what cotton was in the South.

The several kinds of grain are grown more or less in all parts of the section. (Fig. 96.) In the southern half, however, south of Milwaukee, the leading crops are corn, which needs a hot summer; and winter wheat, which, being sown in the fall, needs a moderate winter. Both of these have been grown farther and farther north in recent years. Yet in the northern part of the section the great staple is spring wheat. Considerable crops of barley and rye are also grown, rye especially on sandy soils. Oats are a common crop throughout the section.

Owing chiefly to the grain fields of the North Central section, the United States produces nearly three-fourths of the corn of the world. It likewise grows more wheat and oats than any other country. (Fig. 43.)

172. **Other Crops of the North Central Section.** Since the abolition of slavery, tobacco culture has been making its way from the lowlands into the uplands, and from the south

30%	17%	17%	12%	18%	6%
Argentina 34 million bushels	United States 19	Russia 19	Canada 13	British India 20	All others 7

Data from Year Books of Agriculture, 1913-19

FIG. 97. *Flaxseed crop of the world. Total, average for five years, 112 million bushels.*

toward the north. (Fig. 82.) This migration is the result of more intensive cultivation. Tobacco is now sometimes grown in fields covered with vast tents of cheesecloth, which equalize the temperature, check evaporation, and thus produce a thinner and finer leaf for wrappers.

On rich soils, sugar beets are increasingly grown. In fact, there is something suggesting a sugar-beet belt across the continent and down the Pacific slope. This belt traverses New York, Michigan, Wisconsin, and Minnesota, the largest production east of Colorado being in Michigan. While overlapping corn somewhat, the areas of beet culture lie mostly north of the true corn belt, because beets require to be cultivated at the same time as corn. They moreover call for so much hand labor that a man can care for a much larger acreage of corn than of beets.

Another important crop in the same zone of mixed farming, which extends from New York through Michigan and Wisconsin along the northern margin of the corn belt, is field beans. These are planted, harvested, and threshed much like wheat. In the production of beans, Michigan holds second place.

A third crop in the same zone, north of the corn belt, is potatoes. This is indeed the staple crop on the tracts of sandy soil left by the great glacier. Wisconsin, Minnesota, and Michigan thus have the largest crops of potatoes.

In western Minnesota and the Dakotas, especially where the soil is new and strong, flax is extensively grown for the seed (Fig. 97), which yields linseed oil. This is indispensable in paints, as it dries on exposure to the air.

Temperate fruits are grown for local use in all the states. Along the southern and eastern shores of the Great Lakes, which tend to lessen the extremes of heat and cold, fruit growing for market prevails. The Great Lakes region ranks next to California in the production of fruits.

Certain districts in western Michigan, especially around Kalamazoo, which were settled largely by Dutch, have become famous for celery and other vegetables. In the same districts herbs are grown for distillation of essential oils, especially peppermint, of which Michigan is the largest producer in America.

173. Stock Raising in the North Central Section. As early as 1805 stock began to be driven across the mountains to Baltimore. With the consolidation of the railroads into large systems, after 1850, driving to market gave way to shipment by rail. Stock raising then became more than ever a frontier industry, because free range was available there, and as settlements advanced, and the land rose in value, the herds could be driven on in search of fresh pastures.

In Ohio and Michigan, once the great wool-producing region, sheep are still of importance, though mutton rather than wool is now the main product. Rich soil in this section is, however, too valuable to carry sheep. Moreover, the losses from dogs are serious, but it does not pay to hire shepherds

Wisconsin - cheese & butter
Minnesota -

to protect a small flock. On the plains west of the agricultural zone, cattle and sheep are still raised on wild grasses, and often shipped into the corn belt to be fattened. The grazing industry is thus quite distinct from the feeding industry. Hogs are also raised in the corn belt, in immense numbers; and likewise as a by-product of the dairy, being fed on skim milk. Corn is in fact chiefly fed to stock and marketed "on the hoof." It commands a higher price in the form of meat, and is also condensed, thereby saving two-thirds of the freight. Moreover, live stock is of great value in maintaining the fertility of the soil.

174. Dairy Products in the North Central Section. The dairy industry has made rapid progress in recent years, partly because the soil generally shows the effect of continuous cropping in grain. The leading dairy state in the Middle West is Wisconsin, which leads in butter and cheese. Dairying is the most promising industry on the cut-over pine lands in the lake states, where grasses and roots flourish better than grains. Its development, however, depends quite as much on market conditions as on geographical conditions. Thus dairying has made more rapid progress in Wisconsin and Minnesota, where the farmers have organized coöperative creameries on the Danish model, than it has in Kansas, Nebraska, and portions of Iowa, where centralizers (great private creameries) control the situation and pay the producer seven to eight cents less per pound for butter fat than is paid where coöperative creameries prevail.

175. The Location of Manufactures. The center of general manufactures in the United States follows, although with lagging step, the westward march of the center of population. It is now located in Ohio, which enjoys, together with Indiana and Illinois, the double advantage of abundant fuel and water transportation both by lake and river. (Fig. 98.)

This migration has occurred because industries naturally prosper near raw materials and large markets (§70).

[1]Report of Chief of Bureau of Animal Industry, 1907.

176. Manufactures of Timber. The sawing of pine lumber, or at least the preparation of secondary lumber products, such as lath, sash, and doors, is still carried on to some extent at numerous cities on the Great Lakes and connecting waters, especially Duluth, Minn.; Superior and Oshkosh, Wis.; and Saginaw, Bay City, and Muskegon, Mich. These industries are also found along the upper Mississippi and its tributaries, which originally brought down the logs at slight cost: as at La Crosse, Wis.; Minneapolis and Winona, Minn; Dubuque, Burlington, and Clinton, Iowa; and at the "Tri-City," Davenport-Rock Island-Moline. Comparatively, however, the water

After Fourteenth Census

FIG. 98. *The westward migration of centers of population, agriculture (no data for 1920), and manufactures (no data for 1910 and 1920).*

ways have decreased in importance for logging purposes, being superseded by light logging railways and small mills nearer the timber as the forests have receded from the rivers.

The rivers descending from the upland, north and west of the Great Lakes, generate much water power. This, together with the abundance of pulp wood along the rivers, has given rise to a large manufacture of paper, especially in the district adjacent to Green Bay, Wis. Other localities having special facilities for producing wood pulp are Sault Ste. Marie, where a power canal has been built; the St. Louis River, near Duluth; and the Rainy River, at International Falls, Minn.

Furniture, made chiefly of hard wood, is manufactured at Chicago and other cities, notably Grand Rapids, Mich., where the river served originally to carry timber and drive the machinery. Much of the lumber now comes by rail and most of the mills employ steam; but Grand Rapids remains the most specialized center of furniture manufacture because of business experience, and the presence of skilled labor. Rockford, Ill., situated much like Grand Rapids, and Sheboygan, Wis., on Lake Michigan, also have large furniture factories.

The manufacture of agricultural implements and road vehicles is also dependent on hard-wood forests. It has in a measure followed the westward movement of agriculture because implements and wagons occupy much car space and are therefore expensive to ship.

The centers of the implement industry are Moline, Ill., Springfield, Ohio, and Chicago, and the center of the vehicle industry is at South Bend, Ind. These cities are conveniently located with reference to the Central Plain and have access to hardwood timber and to iron. Other important centers are St. Louis, Mo.; Jackson, Mich.; Racine, Wis.; and Peoria, Ill.

Similar considerations caused the rapid development of the automobile industry along the Great Lakes, especially at Detroit, Mich.

177. Meat Packing. In this country meat packing began at Cincinnati (1818). With the use (since 1868, and especially since about 1880) of ice and more recently of compressed air to chill fresh meat, the packing industry has migrated toward the cattle pastures and cornfields. Live stock occupies more room, needs more care, and is subject to greater losses in transit than are refrigerated meats.

The packing industry has been concentrated in a comparatively few great establishments, which use the entire animal, producing a multitude of valuable by-products.[1]

[1] Including hides, soups, gelatine, and beef tea; oleomargarine, lard, candles, and soap; glue, buttons, and knife handles. In addition, bristles serve for brushes; animal charcoal for sugar refining; hair for upholstering, filling mattresses, and mixing with mortar.

The present center of meat packing is Chicago, the greatest live-stock market in the world, owing to its central location in the corn belt and its transportation facilities. Hammond, just over the Indiana line, has also important packing plants. The advanced stations of the packing industry are on the Missouri at Kansas City, Kans.; South Omaha, Nebr.; St. Joseph, Mo.; and Sioux City, Iowa; and on the upper Mississippi at South St. Paul. Other important seats of the industry are Indianapolis, St. Louis, and Cincinnati, all in the corn belt.

178. **Grain Products.** Starch, syrup, and other corn products are extensively manufactured in the Chicago district. (Fig. 45.) So much corn, indeed, is fed to stock or used in manufactures that relatively little is exported. (Figs 130, 134, and 190.)

The prosperity of the Northwest began (1870) with the system of successive millings of wheat which, by removing the dark-colored bran, suddenly made spring wheat the most valuable for bread making.[1]

Minneapolis, located in the spring-wheat belt at the Falls of St. Anthony, is by far the greatest flour-milling city in the world. Flour milling is likewise one of the leading industries, measured by value of products, in Kansas City, Mo., and Toledo, Ohio, both in wheat-growing regions and originally favored by water transportation; as well as in Indianapolis and numerous smaller cities which are the business centers of rich agricultural districts. Such are Evansville, Ind.; Decatur and Bloomington, Ill.; Des Moines and Cedar Rapids, Iowa; Topeka and Wichita, Kans.

[1] Spring wheat is especially rich in gluten which is advantageous in bread making. But so long as the stones were set close together and the grain reduced to flour at one grinding, the bran, which is coarser in spring wheat, remained with the flour, discolored it, and by absorbing moisture caused it to spoil. The new process consisted in setting the stones farther apart at first and removing the bran in large pieces before reducing the rest to flour. The germ, being oily, is also removed.

The roller or "patent" process differs chiefly in that buhrstones are replaced by rollers, but the principle of successive millings is retained.

Associated with flour milling is the crushing of flaxseed for oil, in which Minneapolis has the same preëminence as in flour.

179. Other Manufactures. One of the principal tanning centers in the United States is Milwaukee, conveniently located to obtain hides from Chicago as well as from the local packing plants, and tanbark from the hemlock forests of Wisconsin. The making of leather goods is, however, widely distributed. St. Louis ranked after Brockton, Lynn, and Haverhill, in 1914, in the manufacture of shoes, while Cincinnati stood first in harness and saddlery.

The manufacture of rubber goods is an immense industry at Akron, Ohio. This is no doubt due to an early start and acquired skill, though the development of the city itself can be traced to its location on the summit level of the Ohio Canal, and the presence of water power.

Ready-made clothing is manufactured in all the large cities, as in the East (§144), and especially in Chicago.

Before 1920 the brewing of beer flourished in all large centers of population, St. Louis and Milwaukee being especially prominent in the industry. But the distilling of strong liquors, was concentrated in a few cities in the heart of the corn belt, chiefly Peoria, Ill., and Terre Haute, Ind. The breweries have largely been taken over for various kinds of manufactures, but most of the distilleries are now producing industrial alcohol.

180. Mineral Fuels. Large "pools" of natural gas and petroleum have been tapped in Ohio, Indiana, southern Illinois, and Kansas. (Fig. 71.) The oil is piped to Cleveland and Toledo, Ohio, and still more extensively to Whiting, Ind., for refining. Pipe lines also extend from the mid-continent field both to the Gulf of Mexico and to tidewater on the Atlantic.

The coal fields of the North Central section embrace nearly half the United States coal lands. The coal in the plains, having been less compressed than in the mountains, is in large part semi-bituminous; while toward the west it is of late origin, and therefore lignitic. For these reasons the plains depend on the Appalachian field for the best bituminous coals. (Fig. 70.)

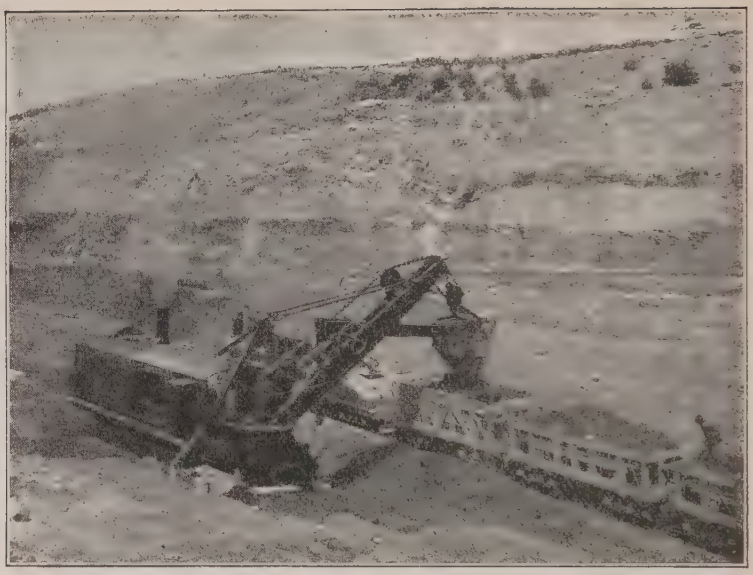
181. Lead and Zinc in the North Central Section. Lead and zinc are found in two districts, which produce more than a third of the lead and zinc mined in the United States. One district around Dubuque, Iowa, was opened by Julien Dubuque (1788), from whom the city received its name. In this district, including also parts of Wisconsin and Illinois, zinc is now the chief product. The other, on the flanks of the Ozarks, especially around Joplin, Mo., was also worked at an early date (1798). There is even a tradition of Missouri lead having been used in the Revolution. The Joplin district now has much the larger output. In recent years many lead and zinc smelters have been erected in the gas and oil belt of southeastern Kansas.

182. Gold and Copper in the North Central Section. Gold is extensively mined in the Black Hills, an outlying part of the Rocky Mountains, chiefly in South Dakota.

On Keweenaw Point, which juts out into Lake Superior, is a layer of porous volcanic rock containing flakes and sometimes huge masses of pure copper. (Fig. 99.) The metal is extracted

Data from Geological Survey

FIG. 99. *Lake Superior iron and copper districts.*



a. Mining iron ore with steam shovel, Mountain Iron Mine.

Copyright, 1902, by Crandall and Fletcher, Duluth

b. Ore dock at Allouez, Wis. Cars run on top and dump the ore into pockets, whence it runs by gravity into vessels, through the long pipes shown in the picture.

FIG. 100. *Modern methods of handling Lake Superior iron ore.*

by mining and crushing the rock. These deposits rendered Michigan for many years (after 1844) the chief source of domestic copper.

183. **Iron Ore in the North Central Section.** The iron ranges about Lake Superior are the remnants of mountains which in remote geological times were probably as high as the Rockies. The iron once diffused through them has been deposited by percolating waters in fabulously rich ore beds.

The Superior iron ores contain few impurities, and run as high as seventy per cent metallic iron. They can be mined in places, especially on the Mesabi Range, by steam shovels. (Figs. 100 and 101.) After the opening of the Sault Ste. Marie Canal (1855) these ores became easily accessible to water transportation. Now as a result the Superior ranges[1] furnish more than four-fifths of our domestic iron ore, and far exceed in output either Great Britain or France. In fact, Minnesota alone commonly mines more iron ore in a year than any foreign nation.

Copyright, 1905, by Keystone View Co., N. Y.

FIG. 101. *Clam shell scoop in hold of vessel taking a 12-ton bite. The scoop is then swung out and dumped on dock or into waiting cars.*

[1] The Superior iron ranges were opened as follows: Marquette (Mich.), 1854; Menominee (Mich. and Wis.), 1872; Penokee-Gogebic (Mich. and Wis.), 1884; Vermilion (Minn.), 1884; Mesabi (Minn.), 1890; Michipicoten (Canada), 1900; Cayuna (Minn.), 1905. (Fig. 99.)

184. **Manufactures of Iron and Steel.** Owing to the lack of coal near the Superior iron ranges, the ore is mostly shipped to the south shore of the lakes, or even some distance inland from that shore, where it meets the coke from Connellsville and West Virginia: for example, at Cleveland, Youngstown, and Columbus, Ohio, in the Erie district; and at South Chicago, Joliet, and Gary, the new steel city, adjacent to Lake Michigan. This iron-ore traffic has also built up a row of ports along the south shore of Lake Erie, notably Ashtabula, Conneaut, and Lorain. Now, however, two-thirds of a ton of coke (in place of six tons as formerly) suffices in modern furnaces to smelt a ton of ore. As a result, the coal is sometimes shipped, being coked in by-product ovens near the steel works in order to utilize the gas. Certainly the recent establishment of a complete steel plant on the St. Louis River near Duluth shows that the margin of profit in shipping the ore to the coke, rather than the coke or coal to the ore, is getting narrow and may soon disappear.

The manufacture of machinery and of miscellaneous iron and steel wares is widely distributed, being perhaps most important in cities having water transportation, such as Chicago, Milwaukee, Detroit, Toledo, Cleveland, and Cincinnati; also Davenport and Quincy, on the Mississippi. On the other hand, the iron works at Hamilton near Cincinnati, and at Aurora near Chicago, are favored by lower ground rents. This advantage is more and more attracting manufactures to suburban cities.

Cash registers are a specialty at Dayton and ornamental iron work at Canton, Ohio, both on the edge of the Pittsburgh-Cleveland iron-smelting district. The principal watch factories in the Middle West are at Elgin, Ill.

Steel shipbuilding is an important industry at the principal lake cities; as is the manufacture of cars and other railway equipment at railway centers, notably Chicago, St. Louis and East St. Louis, St. Paul, Council Bluffs, Fort Wayne, Ind., and Springfield, Ill.

185. **Other Mineral Products.** Vast beds of gypsum, associated in places with rock salt, extend from Texas through Kansas into Iowa, and reappear again in Michigan. These were presumably left behind by the drying up of some ancient sea. Water is pumped through the beds and then evaporated, coal being here used in place of solar heat as in dry climates. The abundance of salt is one cause that has favored the growth of a large chemical industry at Detroit.

Ohio, possessing an abundance of clay and coal, leads in the manufacture of the finer clay products. East Liverpool and Cincinnati compete with Trenton, N. J., in pottery, while Zanesville is noted for art tiling and pressed brick.

Important glass and tin-plate industries have grown up on the Ohio-Indiana gas field, especially at Muncie and Anderson, Ind. Muncie, indeed, rivals Pittsburgh in glass blowing.

Other mineral manufactures are grindstones, made of Berea grit, in Ohio; and Portland cement, manufactured in the region adjacent to the Great Lakes and the Ohio. (Fig. 73.)

186. **Water Ways of the North Central Section.** Within the memory of men still living, most of this region was a virgin wilderness; probably never before was it given to any man to behold such a transformation. Rapid development has been favored by the navigable rivers and lakes, the level surface equally favorable for canal and railway construction, and above all by the use of steam. Thomas Jefferson, in 1803, thought it would be a thousand years before the region east of the Mississippi could be fully settled. He was right, reckoning as he did without steam or electricity.

After the launching of the first steamboat on the Ohio (1811), steamboats soon made their way on to all the navigable rivers. A generation later the coming of railways from the East to the Mississippi (1854) and to the Missouri (1859) drew traffic eastward and checked the growth of river cities, except those which became railway centers.

The upper Mississippi still floats large quantities of logs, though few compared to ten years ago; the Ohio carries great

fleets of barges loaded with coal; while the Missouri, having for most of its course no commodity to transport which cannot as well go by rail, is practically deserted. The heaviest traffic is on the Ohio. (Fig. 102.) The steamboat "Sprague" has taken 70,000 tons of coal (sufficient to load some fifteen miles of freight cars) to New Orleans in one tow, at a cost of 3.2 mills per ton per mile.

The Mississippi system, embracing about one-third of the

Courtesy of Cincinnati Industrial Bureau

FIG. 102. *Fleet of barges carrying coal down the Ohio.*

mileage of navigable rivers in the United States is connected by canal with the Great Lakes along four routes, following the portages of the early French explorers and fur traders. These canals connect: (1) the Wisconsin and Fox rivers; (2) the Illinois and Chicago rivers; (3) the Ohio River with Lake Erie at Toledo and Cleveland. (Fig. 59.) There is also a canal recently completed by the Federal Government connecting the Illinois River with the Mississippi at Rock Island. (Fig. 62.) Most of these canals will have to be either deepened or abandoned as they

are much too shallow (four to seven feet) to compete with railways.

The state of Ohio, indeed, has already authorized the deepening to twelve feet of the Ohio Canal from Cleveland to the Muskingum River, which is to be improved through to the Ohio by the Federal Government. A private corporation has also undertaken a ship canal from Pittsburgh to Lake Erie, so that coal and iron may go through without transhipment.

The Chicago Drainage Canal (twenty-four feet deep), paralleling part of the way the earlier and smaller Illinois and Michigan Canal, is doubtless the beginning of a deep-water connection with the Gulf of Mexico. The project of deepening the Illinois and Mississippi rivers so as to afford a fourteen-foot channel from the Great Lakes to the Gulf is already a live issue and will certainly command still stronger support after the effects of the Panama Canal begin to be felt.

The Great Lakes, however, are far and away the most important factor in the commerce of this region, forming a superb water way over a thousand miles into the very heart of the continent, bearing in a year one-third as much freight as all the railways in the United States and at about one-tenth the cost.[1] A single vessel in 1908 carried from Duluth to Buffalo 422,000 bushels of grain, equivalent at fourteen bushels to the acre to the crop from about fifty square miles of wheat fields. The Sault Ste. Marie Canal (Fig. 103), connecting lakes Superior and Huron, carries a tonnage three times greater than the Suez Canal. Cargoes go in bulk, unbroken, from Duluth and Chicago to Buffalo; by using the Welland Canal or the enlarged Erie Canal, they may even reach the sea.

187. Commercial Centers of the North Central Section. The level surface, high average fertility, and relatively dense population of the Central Plain have caused it to be covered with a close-meshed net of railways (Fig. 127) especially south

[1] In 1904 the average freight rate per ton per mile on the Great Lakes was .81 mill; on the railways it was 7.8 mills.

of the Great Lakes. This condition permits commerce to follow as a rule the shortest routes. Each city is thus a commercial center for a considerable district. Some, however, are located "in the very throat of the converging lines of commerce."

This is preëminently the case with Chicago, at the southwestern end of the Great Lakes route, where all railways from the West and Northwest of necessity converge in order to pass

FIG. 103. *The Sault Ste. Marie Canal. Vessels at left are being let down from the level of Lake Superior to the level of Lake Huron by gradual lowering of water between two sets of gates.*

around Lake Michigan. This location, which made Chicago the greatest railway center in the world, is the one great advantage possessed by Chicago over Milwaukee. More than any other city, Chicago seems to embody the very spirit of the prairies; for there things are done on a truly gigantic scale.

But for the Canadian boundary, which turns commerce from the natural line of least resistance, Duluth-Superior, at the northwestern end of the Great Lakes route, would be a second Chicago, controlling the trade of all western Canada.

Canada extends nearly as far south as Chicago; but the Great Lakes bar admission by rail from the West except in three places. At Sault Ste. Marie a bridge forms the connecting link between the northwestern states and Montreal. Again, the narrow waters between lakes Huron and Erie are tunneled at Port Huron for a line from Chicago direct to Toronto. Finally, another tunnel at Detroit opens the shortest railway route from Chicago to Buffalo. Detroit, situated on the most frequented strait in the world, where goods for the southern portion of Michigan are landed, is thus in addition the gateway from the West to southern Canada, and one of the gateways to New York.

St. Louis was located by Laclede (1764) as a center for the fur trade, on a commanding bluff near the mouths of the Illinois and the Missouri. This convergence of river valleys in the midst of the Central Plain has made St. Louis a great commercial center both by river and rail. Cincinnati occupies a somewhat similar position with reference to the Ohio and its tributaries. St. Louis and Cincinnati, together with Louisville, are the principal gateways toward the South.

In like manner, Kansas City and Omaha owe their development to the convergence of river valleys, affording easy routes for railways; while the Twin Cities—Minneapolis and St. Paul—grew up, the one because of water power, the other at the head of ordinary navigation on the Mississippi. These are the gate cities toward the West. At each of these centers the railways converge; and from it they again diverge into the territory beyond.

188. "The Winning of the West." Nations, like rivers, strive ever to reach the sea. The United States would have been permanently crippled had any strong foreign power retained its hold upon the western bank of the Mississippi.

For this reason, it was impossible that the northern provinces of Mexico should permanently bar the American advance toward the Pacific. (Fig. 124.) No matter how much we may theorize about it, nothing can in the long run avail to protect rich lands, sparsely peopled by ignorant and unprogressive populations, from occupation by more intelligent and energetic races.

189. "The Land of Little Rain." From the beginning of the Great Plains (2,000 feet elevation), approximately along the 100th meridian, to the snowy crest of the Sierra Nevada, a distance of some 1,200 miles, stretches "the land of little rain." Only the higher ranges there condense enough moisture to support forests. Throughout most of this vast region, land alone is worthless, but water is priceless; whoever controls a spring or flowing well (Fig. 104), or a stream fed by the mountain snows, is indeed lord of all he surveys.

Toward the southwest, in New Mexico and Arizona, the descending air currents (§52) and the more rapid evaporation due to the greater heat produce some patches of true desert.

Toward the north, on the other hand, lower temperature and stronger west winds produce a heavier rainfall. There, too, the Columbia Gap admits the moisture-laden winds as far as the lofty Bitterroot Range, thus helping to water the splendid wheat district over rich lava soils about Spokane.

In spite of the great elevation, even the valleys being 6,000 to 8,000 feet above sea level, the region between the Rockies and the Sierra Nevada enjoys a surprisingly mild climate, because the sun shines the year round from an almost cloudless sky.

190. **The Pacific Slope.** The western slope, lying open to the Pacific, has an oceanic climate, comparatively warm in winter and cool in summer. Los Angeles in July is not so warm as New York; Seattle in January is warmer than Richmond, Va.

Southern California, "facing the sea and the sun" (since there the Coast Ranges trend nearly east and west), has a subtropical climate with almost rainless summers, like Algeria and southern Spain (§52). Irrigation is usually needed south of San Francisco, and prevails behind the Coast Ranges even farther north.

U. S. Geological Survey

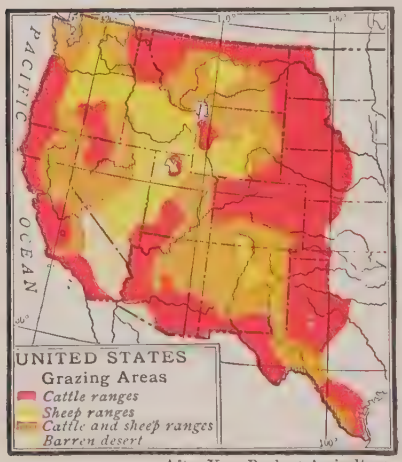
FIG. 104. *Artesian well at Woonsocket, S. D., throwing stream ninety-seven feet high.*

In contrast to most of California, the Pacific slope north of Mount Shasta is a humid district, the rainfall increasing rapidly toward the north. Here, however, as in California, summer is the dry season, winter the rainy season; because the colder the land, the more it chills the warm winds from the Pacific. Here is found the true "new England" of America, where soil and climate most nearly reproduce old England.

191. **Stock Raising in the West.** During the three centuries of Spanish dominion, the few Spanish ranchers in California and New Mexico dreamed away their days amid the most glorious scenery and sunshine in the world.

Here, if ever, the pastoral Arcadia of the poets was realized. Why toil and sweat to raise crops or dig gold when their herds supplied every rustic luxury? So the Mexicans reasoned; not so the Americans.

The pastoral industry has, nevertheless, continued to develop in the upland valleys along the Pacific; while in the vast region between the Missouri River and the Sierra Nevada Range, stock raising (Fig. 105) followed hard upon the heels of the hunter and trapper. These lofty plateaus are the true stock country, furnishing most of the young cattle shipped into the corn belt and having by far the largest clip of wool in the United States. (Fig. 106.) Half-wild horses are also raised on the plains; likewise asses and mules in the mountains where they are indispensable as pack animals, being sure-footed, able to live on little, and to stand much hard usage.



After Year Book of Agriculture

FIG. 105. *Stock ranges in the West.*

The westward migration of sheep raising has injured the cattle ranges, since sheep crop the grass so close to the roots that cattle can not graze after them. Moreover, the homestead unit of 160 acres is too small for stock farming; consequently as homesteaders have pressed on westward, building their shacks by springs and streams which before served as watering places, cattle raising has decreased. Finally, the stockmen, grazing their herds on public land, have crowded more animals on it than the grass could permanently support. Already large tracts have been transformed into deserts of wind-blown sand, thus causing a material decline in the grazing industry. Many believe

Courtesy of Geological Survey

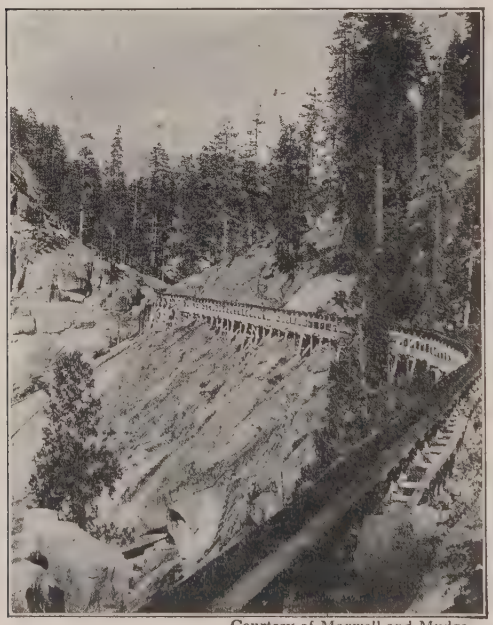
a. Windmill and reservoir for watering cattle on the high plains.

b. Sheep grazing in the arid country near Powder River.

FIG. 106. *The grazing industry.*

that this decline has also been hastened by a combination of packers, resulting in low prices to stockmen, high prices to the public, and large net profits for the packers.

192. Other Animal Industries. The dairy, poultry, and bee-keeping industries made marked progress on the Pacific slope during the last twenty years. The leading dairy districts are the Willamette Valley and northern California, where large cities are at hand and where the land had begun to lose fertility from being cropped too continuously in wheat. San Francisco is surrounded by the greatest poultry district in the world. Fruit and bees, moreover, thrive together. Ostrich farming has also become a prosperous industry in some parts of Arizona and southern California.



Courtesy of Maxwell and Mudge

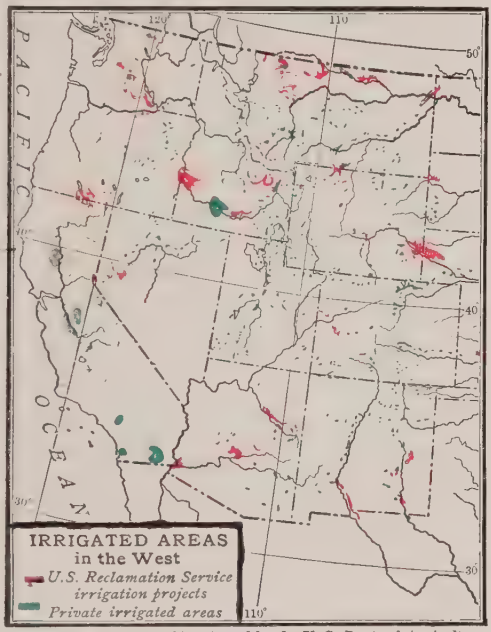
FIG. 107. *Flume for conveying timber out of the mountains. It is flooded when logs are to be moved.*

193. The Forests of the West. The scattered yellow-pine forests on the Rocky Mountains have furnished much timber for the mines; but their exhaustion is at hand unless still larger forest reserves are established and effectively protected from sheep and goats, which destroy the young growth.

Such protection is especially important because the climate is apparently growing drier. Beach marks on the mountains

show that Great Salt Lake once stood a thousand feet higher than at present. The groves of *Sequoia Gigantea*, in California—the most majestic trees in the world, approaching 400 feet in height, some of which were 3,000 years old at the birth of Christ—are also a legacy from a moister climate, being found in some districts now too dry to reproduce forests.

The northern Pacific slope contains the largest body of standing coniferous woods in the United States and the most valuable on account of the enormous size and the splendid quality of the trees. Nowhere else are modern methods employed so effectively in lumbering operations. (Fig. 107.) Redwood occupies a narrow strip along the coast of California, from San Francisco north. Farther inland in California, and also in southern Oregon, the prevailing species are the western yellow pine and the sugar pine. In the moist Puget Sound region, the red or Douglas fir predominates, mingled with cedar, which is employed for shingles.



From Forestry Map issued by the U. S. Dept. of Agriculture

FIG. 108. *Irrigated lands in the West.*

194. Fisheries of the West. San Francisco has succeeded New Bedford as the headquarters of most of the whaling vessels still afloat, which hunt in far Northern waters. The Oregon and Puget Sound waters swarm in season with salmon,

39%

10,000,000

Courtesy of U. S. Reclamation Service

FIG. 109. *Opening of the first irrigation canal, Truckee-Carson project, in Nevada, the first work completed by the Reclamation Service.*

which are taken by nets, traps, and wheels driven by the current. Fish hatcheries are now necessary to maintain the supply. Canned salmon is the principal fishery product exported from the United States. (Fig. 131.) The leading canning centers are Astoria, Ore., at the mouth of the Columbia, and Bellingham and Seattle, Wash.

195. Irrigation in the West. Though the West as a whole is rugged in surface, there are vast tracts of fertile soil, especially in the broad valleys between the Sierra and the Coast Ranges, also on the upper Columbia, and in numerous intermontane basins such as the Big Horn and Uncompahgre valleys, North, Middle, and South parks, San Luis Valley, and Salt Lake Basin. The soil is exceptionally fertile, because

Courtesy of Southern Pacific Ry.

FIG. 110. *Irrigating a field, Pajaro Valley, California.*

not leached of its soluble parts by rain; but throughout much of the section, water must be brought to the land or there will be no harvest. (Figs. 110, 111.) For this reason the Federal Government has set aside the proceeds of land sales in arid and semi-arid states as an irrigation fund, and has established an efficient Reclamation Service to carry on the work. (Figs. 108, 109.)

It is estimated that over 50,000,000 acres in all, situated in valleys and along the foot of mountains, can be irrigated and thus transformed from desert to garden. The census showed 19.1 million acres actually under irrigation in 1919; while 35.8 million acres were covered by irrigation projects. (Fig. 111.)

FIG. 111. *Picking raisin grapes grown by irrigation.*

The current of rapid streams, and the power secured by the erection of gigantic reservoir dams, can even be used to lift water onto the uplands. Irrigation will therefore mean the creation of many densely-peopled farming communities separated by arid regions. It will stimulate mining by providing cheaper food. Finally, it will cause the growth of manufacturing and commercial cities, wherever mechanical power and transportation facilities are most available.

The possibilities of irrigation are especially interesting along the Colorado—the American Nile—which in its lower course flows practically on a ridge through a region very like Egypt in climate, and lacking only water to rival it in fertility. This district includes the Imperial Valley of California, filled to unknown depths with fine river-borne soil.[1] (Fig. 112.)

196. Dry Farming in the West. East of the Rockies, most of the rain falls in summer, owing to the draft of air up the Mississippi Valley at that season (§155). In recent years, it has therefore been found possible to grow certain drought-resistant crops in the Great Plains, without irrigation. Such are Kafir corn, a kind of millet (sorghum); milo, another millet grown in the dry Southwest; and especially durum wheat, which has already become an article of export to the Mediterranean countries and forms a considerable part of the total wheat crop of the United States. (Fig. 114.)

West of the Rockies the rain, coming from the Pacific, falls chiefly in winter. Much of the soil, moreover, is underlaid by clay which is almost impervious to water. These two facts are taken advantage of in a new type of dry farming which seems capable of great development. (Fig. 113.)

In some places, the streams which descend the hillsides in winter are diverted onto the fields, where the water is stored in the sub-soil. This practice of winter irrigation enables

[1]The Imperial Valley is the end of the Gulf of California which was cut off by the delta of the Colorado, advancing from the east; and then dried up, leaving salt (Fig. 122) deposits in the lowest part, called Salton Sink. This is 287 feet below sea level.

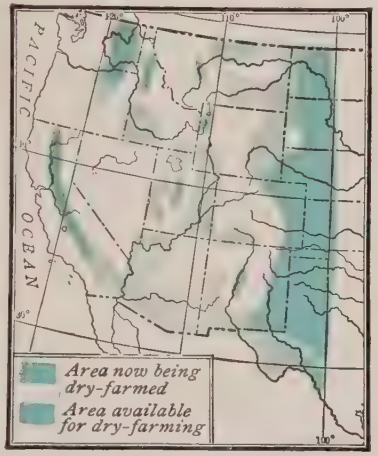
In 1905 the Colorado at flood cut a channel into Salton Sink, again creating an inland sea.

crops to be grown yearly. Where such streams are not available, it is possible to obtain a crop every other year by storing the rains of two winters in the soil and keeping the surface covered during the intervening summer with a dust-mulch to

FIG. 112. *Relief map of the lower Colorado Valley.*

check evaporation. This method, which would not be possible if the rain fell in summer (for it would then at once evaporate) enables wheat and some other staple crops to be grown with ten or twelve inches of rain a year.

197. Agricultural Products of the West. The leading crops of the West are grain and hay. The principal cereals grown are wheat, barley, and oats. In California, barley takes the place of corn (which needs a moister climate) as a food for stock. The grain fields are mostly in the broad valleys of the Pacific slope and in the Columbia basin around Spokane. Owing to the dry summers the grain in most districts dries on the stalk so thoroughly that it can be cut, threshed, and sacked by one machine (Fig. 115), thus economizing labor and leaving the straw in the fields to fertilize the soil. Vegetables are also important, especially potatoes and sugar beets, besides lima beans in southern California.



Dept. Agriculture, Div. of Statistics, Bul. XX.

FIG. 113. *Dry-land areas.*

FIG. 114. *Dry-land farming. Districts producing durum wheat.*

Heavy freight charges on bulky commodities have, however, discouraged grain farming. In Oregon small areas of the best soil are occupied by hop yards (Fig. 116); and on all parts of the Pacific slope the farmers have turned their attention largely to fruit (Fig. 117), since the invention of the refrigerator car. In the aggregate value of her fruit crop, California is unrivaled. Temperate

a. Plowing.

b. Planting wheat.

Courtesy of Holt Mfg. Co.

c. Combined harvesters which cut, thresh, and sack the grain, in one operation.

FIG. 115. *Farming by steam on the Pacific slope.*

orchard fruits, such as peaches, apples, and plums (prunes), exceed in value the subtropical fruits, such as oranges, lemons, olives, and figs. Grapes, yielding raisins and grape juice, rank next to oranges. (Fig. 111.) Nut growing, especially almond and walnut culture, is also a distinct industry. (Fig. 117.)

The date palm has been successfully introduced in the desert regions of southern California and Arizona. (Fig. 118.) It needs an average summer temperature of at least 70° F., and one month of 80° F. The drier the air the better the date palm thrives, yet its roots must have abundant moisture. It is thus emphatically the tree of the desert oasis. (Fig. 21.)

FIG. 116. *Irrigated hop yard on the Pacific slope.*

198. Metallic Products of the West. The fierce rush over seas and deserts which followed the discovery of gold in California, the growth of cities almost over night, and the peopling of a state within three years, are matters of history.

Gold is still the principal metallic product of the Pacific slope. (Fig. 119.) The gold-bearing gravels, forming a belt twenty to sixty miles wide along the western foothills of the Sierra, were originally panned by hand. This form

a. Tent in position for fumigation with poisonous gas to kill insects in fruit trees.

Courtesy of Bureau of Plant Industry

b Almond harvest.

FIG. 117. *The fruit industry in California.*

of placer mining, requiring no machinery, was the poor man's opportunity. Later came hydraulic mining, which was finally checked by law because it filled up rivers and spread sand over agricultural lands in the lower valleys. Now gold dredges run by electric power from the Sierra and floating in lakes of their own creation, are eating their way back and forth through the land, working over the gold-bearing gravel down to bed rock. (Fig. 120.)

With the rise of vein mining, however, nearly all the Cordilleran states became producers of the precious metals.

Courtesy of Dept. of Agriculture

FIG. 118. *Young date orchard near Tempe, Arizona.*

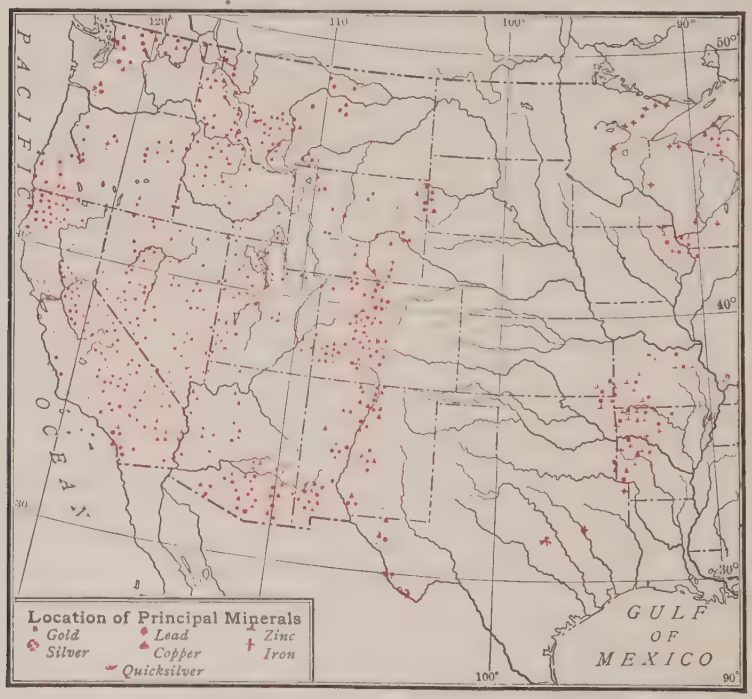
Colorado, indeed, has often held first place, having the richest gold district in the United States around Cripple Creek, and the principal silver-lead district around Leadville.

Mercury, the only metal fluid at ordinary temperatures, is mined extensively at New Almaden, Cal.; lead in the Cœur d'Alene district of Idaho; copper in Arizona, Montana, and Utah. Butte, Mont., is the greatest copper city in the world. Abundant deposits of tungsten have also been located in Colorado and Arizona. Iron is widely distributed, the largest output being in Colorado, though the richest iron deposits in the West are in southern Utah, especially Iron County.

for electric lights
Metal

The western mountain states all depend chiefly on the ores "dug from central gloom." Farms and ranches exist there to feed the mining camps. It is, moreover, through the products of its smelters that this region enters into the commerce of the world. Shaler even surmises that in the future as many men will toil here in the dark recesses of the mines as work upon the surface of the earth.

199. Other Mineral Products of the West. Coal underlies considerable areas along both flanks of the Rockies, and smaller districts on the Pacific slope. Unfortunately, most of the coal fields near salt water are rather small and scattered, while those in the Rocky Mountain region are dependent on transportation by rail. (Fig. 70.)



After U. S. Geological Survey

FIG. 119. *Location of principal metallic deposits in the West.*

The coal is all of late origin, and mostly lignite. But in parts of Colorado and Washington it has been transformed,

Courtesy of the Bucyrus Co.

FIG. 120. *A modern gold dredge at work.*

by heat and pressure during the upheaval of the mountains, into bituminous coal of coking quality; and in certain small districts of Colorado and New Mexico, near lava flows, it has even been changed into anthracite. Colorado, holding first place in coal and iron west of the Mississippi, has become the Pennsylvania of the West.

Important petroleum fields have been tapped in several states. The most productive is in southern California, where, owing to the total lack of coal, the crude oil (Fig. 121) is of great importance as fuel. California also ranks high in the production and consumption of natural gas, and stands next to Oklahoma in these mineral products. The output of oil and gas in California is now more valuable than the gold.

When petroleum is long exposed to the air, the lighter parts evaporate, leaving ozokerite, a natural paraffin used for candles, or asphaltum used for pavements. The largest output of asphaltum is in California, though more extensive deposits are found in Utah. An artificial asphaltum is also made in California by distillation of petroleum.

The substances left by evaporation of salt water are widely distributed in the West, especially gypsum. Salt occurs

chiefly near Salt Lake and in California (Fig. 122); borax, in the most arid districts, such as Death Valley.

Precious and semi-precious stones occur in several districts: turquoise in New Mexico and Arizona, whence the Indians obtained their supplies; sapphires in Yogo Gulch, Mont.; topaz, beryl, and tourmaline near San Diego, Cal.; a petrified forest, containing agate and chalcedony, near Holbrook, Ariz.

200. Manufactures in the West. Manufactures in the West are mostly neighborhood industries, the products being consumed near at hand. They are somewhat protected from outside competition by the high freight rates from other sections; but by the same means most of them are prevented from finding a larger market.

In the mountains, the smelting of ores is the leading industry: for example, at Butte, Mont. It is also important at Seattle, near the principal Pacific coal fields. Colorado has

Courtesy of the U. P. Ry.

FIG. 121. *Oil wells and derricks in the Bakersfield district, California.*

developed a considerable iron and steel industry, notably at Pueblo; and steel ship building has made some progress on the

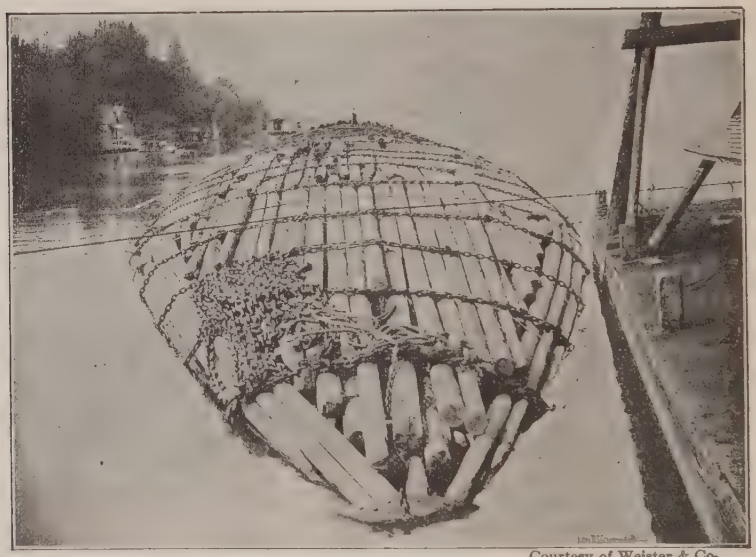
Courtesy of Professor J. E. Chamberlain

FIG. 122. *Salt piles in the Salton Sink before the Colorado rose and flooded it. As water came to the surface of the sink and evaporated, it left a layer of salt which was frequently scraped into piles and hauled away and as often renewed.* (*Fig. 112.*)

coast, especially at San Francisco, despite the lack of coal and iron in the vicinity. The mining machinery made in Denver and Los Angeles is known in many parts of the world.

Pacific coast cities are concerned chiefly with lumber, foodstuffs, and mining machinery. Slaughtering and meat packing are of importance in Tacoma, Spokane, San Francisco and Los Angeles. Lumber is a leading product at Seattle, Tacoma, Portland, and Spokane, located near the heavily forested region. (Fig. 123.) Flour milling is also a prominent industry in all these cities, notably at Spokane, the "Minneapolis of the Far West," likewise at Stockton and Sacramento, all situated in wheat districts. In San Francisco and Los Angeles, the supply points for many mining camps, foundry products rank high. San Francisco also has extensive refineries for Hawaiian cane and California beet sugar, while the canning industry

is found both in California, using fruit, and along the Columbia and Puget Sound, where fish are extensively tinned.



Courtesy of Weister & Co.

FIG. 123. *Timber raft on the Columbia ready for towing to San Francisco. The logs are piled into a deep frame shaped like a ship in order to ride the waves.*

Dependent on the herds and flocks are the leather-tanning industry in California and the manufacture of woolen goods in the Columbia and Puget Sound country.

The manufacture of moving-picture films, in which the United States leads, also centers in southern California, where there is usually sunshine.

Another condition favorable to manufactures, besides the abundance of raw materials, is the enormous water power available on both flanks of the Cordilleran Highland; notably, at Great Falls, on the Missouri; at Colgate, near the foot of the Sierra, whence the electric current is carried to Oakland and San Francisco; at Spokane, the Dalles, the Cascades, and Oregon City, on the Columbia system; and on many of the streams flowing into Puget Sound.

201. Transportation Facilities of the West. The West, being in the main a lofty table-land, has few inland water ways. The rivers entering San Francisco Bay are, indeed, navigable for some distance; below Stockton and Sacramento they carry considerable traffic. The one water way of real commercial importance, however, is the Columbia system, navigable by seagoing vessels to Portland on the Willamette (110 miles) and by river steamers to Lewiston on the Snake. At the Dalles a canal eight and one-half miles long and eight feet deep at low water has been built around the rapids (1915).

The railways in the West consequently hold the power of commercial life and death. Moreover, railway construction is unavoidably expensive there, because of the rugged surface and great elevation of the mountain passes. The lowest summit level on any Pacific railroad is about double the

FIG. 124. *The early highways to the Pacific.* (*Compare Fig. 61.*)

highest elevation on any railway crossing the Alleghenies. The result of these conditions is such high freight rates as seriously to limit many industries.

202. Inland Commercial Centers of the West. Denver, the one great city of the plains, is mountain born, having been at first merely a stagecoach station and outfitting headquarters for mining camps. It has now become the commercial

Courtesy of Great Northern Ry.

FIG. 125. *Sacked wheat at Waterville, Wash., waiting shipment down the Columbia to Portland.*

center of the entire Rocky Mountain region, to which it is the central gateway. More than a dozen lines of railways enter its stations.

On the vast plateau between the Rockies and the Sierra, the principal commercial center is Salt Lake City, reached from the East by a number of railways,[1] while from it lines

[1] The Union Pacific and the Denver & Rio Grande (Gould line), built; the Denver & Salt Lake under construction.

radiate to Butte, Portland, San Francisco and Los Angeles. Spokane holds a somewhat similar position in the upper Columbia Basin.

203. Seaports West of the Coast Range. The Pacific coast is singularly straight and unbroken, with mountains rising directly from the sea. Such a coast line is in general unfavorable to commerce.

San Diego, on a small but secure harbor, sheltered by a sand bar—the famous Coronado Beach—is the natural outlet of Arizona and the Southwest. It was hemmed in by the Coast Range which rises just behind it and has pursued largely "the business of pleasure" as a seaside resort. The completion of a railway through the mountains to Arizona opens a way for commercial and industrial development.

In like manner Eureka, on Humboldt Bay, has been practically limited by the Coast Range to handling redwood lumber from the adjacent mountains, for which it is the principal port of shipment; but railway connection with the interior is now established.

Los Angeles, the "City of Angels," lies on the seaward slope of the Coast Range, opposite a low pass or gap (the San Bernardino, now traversed by three lines of railway) which leads over into the Imperial Valley; this in turn opens opposite the Gila Valley, forming a natural route toward the Gulf of Mexico. Thanks to this situation, which in effect eliminates both Coast Range and Sierra, and to a climate as mild as that of southern Italy, Los Angeles has become the business and residential center of the Far Southwest.

Like Athens and Florence, Los Angeles stands a few miles inland, having been founded without thought of sea-borne commerce. For ocean traffic it depends upon an artificial harbor at San Pedro protected by a 9,000-foot government breakwater and inclosing an inner bay called Wilmington Harbor. (Fig. 126.) Three railways extend to San Francisco, one along the sea and two through the great San Joaquin Valley.

204. Seaports that Pierce the Coast Range. The Coast Range is pierced by navigable waters at only three places in the United States: San Francisco Bay, Columbia River, and Puget Sound. On these are consequently the great Pacific ports, which handle the bulk of American commerce with the Orient.

San Francisco has a harbor larger and more easily accessible than that of New York. It became important, in the first place, through the discovery of gold in the Sacramento Valley, and it profits most from trade with Hawaii, Samoa, Australia, and the Philippines. San Francisco is now the terminus of four transcontinental railways,[1] and it is the commercial metropolis of the Pacific slope. Moreover, just as the Pacific cable released (1903) oriental commerce from tribute to the overland telegraph, so the Panama Canal frees trans-continental commerce from dependence on the railways.

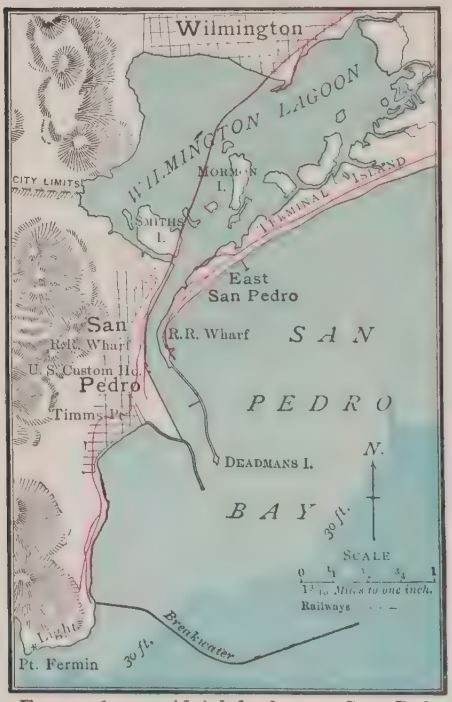


FIG. 126. *Artificial harbor at San Pedro.*

Portland is a river port like New Orleans; and now that the troublesome bar at the mouth of the Columbia has been conquered by jetties, and the rapids in the river are passed by canals, Portland

[1]The Southern Pacific and the Santa Fe coming up from the south; the Union Pacific and the Western Pacific (the new Gould line) coming by way of Great Salt Lake. (Fig. 61.)

will no doubt play a somewhat similar part in commerce. In fact, it has the added advantage that the Columbia runs with, in place of across, the general course of commerce. Portland is already a great grain and lumber port. It is, moreover, reached by railways from San Francisco and Puget Sound; while from the east, branches of the Union Pacific and of the Great Northern descend the Columbia Valley.

The spacious and secure harbors on Puget Sound, however, are the chief rivals of San Francisco for oriental trade. The principal ports, from the mouth toward the head of the Sound (117 miles) are Bellingham, Everett, Seattle, Tacoma, and Olympia. On Puget Sound are the terminals of the three northern transcontinental lines: the Great Northern, Northern Pacific, and the new extension of the Chicago, Milwaukee & St. Paul, called the Chicago, Milwaukee & Puget Sound (1909).

The Puget Sound ports are favored by the fact that they stand opposite the lowest, narrowest, and least sterile part of the Cordilleran Highland. They also profit most from the development of Alaska; and the shape of the earth is in their favor, bringing China and Japan nearer to Puget Sound than to ports farther south.

The Western Section

XIV—THE UNITED STATES IN THE MARKETS OF THE WORLD

"There be three things which make a nation great and prosperous: a fertile soil, busy workshops, and easy conveyance for men and goods from place to place."—Lord Bacon.

205. The Foundations of Commerce. Commerce is rooted in the people and the soil. "A nation's commerce is born of its industry and is part of its struggle for the necessaries, the comforts, and the luxuries of life." (Webster.)

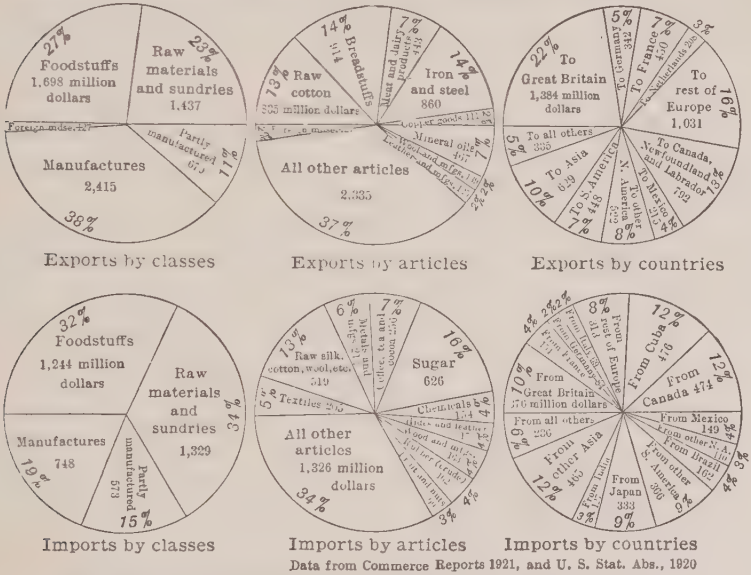
The people of the United States are active and adventurous by right of inheritance; for only those of such a disposition were willing to brave the uncertainties of a New World. Moreover, frontier life, in conflict with untamed nature and savage foes, bred inventiveness and self-reliance. Finally, self-government has powerfully promoted general education and intelligence.

The natural resources of the country match the spirit of the people. No other equal area in the world has such a combination of fertile soil, abundant minerals, navigable waters, excellent harbors, and temperate climate. And no other great nation, except Russia, fronts on the two greatest oceans.

Everything goes to show, as De Tocqueville long ago observed, that the United States seems formed by nature to become the first commercial nation of the world. The achievement of this high destiny is, however, reserved for the future.

206. Staple Products of the United States. All new countries of necessity first exploit the crude resources of sea, forest, field, and mine. They must have food and raw materials before they can undertake manufactures. There is consequently a natural order in the development of industry and commerce.

The United States first entered foreign markets as an exporter of fish and timber from the North Atlantic states, tobacco and cotton from the South Atlantic states, grain and animal products from the Mississippi Valley. The area of largest production has indeed shifted westward with the march of population; but raw products still make up a large part of American exports. (Figs. 128, 130, and 134.)



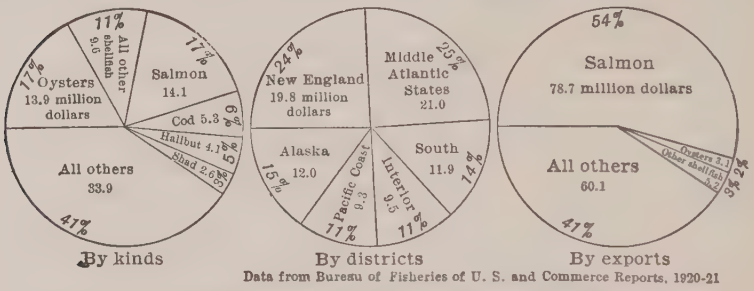
Data from Commerce Reports 1921, and U. S. Stat. Abs., 1920

FIG. 130. *Foreign commerce of the United States. Total average for two years (millions of dollars): exports 6,356; imports, 3,894.*

207. Fish and Furs. Fish were for colonial New England very nearly what tobacco was for Virginia; and a codfish over the Speaker's chair in the State House at Boston still symbolizes the importance of the fishing industry to Massachusetts. In the country at large, the fisheries employ nearly a quarter of a million workers, supporting upward of a million people.

For the last half century, however, the Atlantic fisheries have been slowly failing. The exports of fish, mainly canned

salmon from the Pacific coast, are now less than the imports. (Fig. 131.) It is important that the fisheries be preserved, if



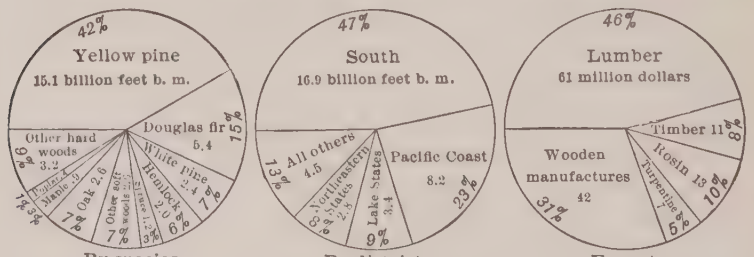
Data from Bureau of Fisheries of U. S. and Commerce Reports, 1920-21

FIG. 131. *Fishing industry of the United States. Total (millions of dollars): catch, 83.5; exports, average for five years, 147.1.*

possible, not only as a source of sea food, but also as a nursery of able seamen and rugged virtues.[1]

The exports of furs, including among other kinds seal and sea-otter pelts from Bering Sea, are greatly exceeded by the imports from Canada and the cold parts of Europe and Asia.

Curiously enough, up to 1913 sealskins were commonly sent to London for finishing, and then repurchased at a greatly



Fourteenth Census; U. S. Stat. Abstract 1920, Summary Foreign Commerce, Dec. 1921.

FIG. 132. *Lumber industry of the United States. Totals, averages for five years: cut, 35.8 billion feet. b. m.; exports, 134 million dollars.*

increased price. This illustrates how relatively undeveloped many American industries are.

[1]See Kipling, *Captains Courageous.*

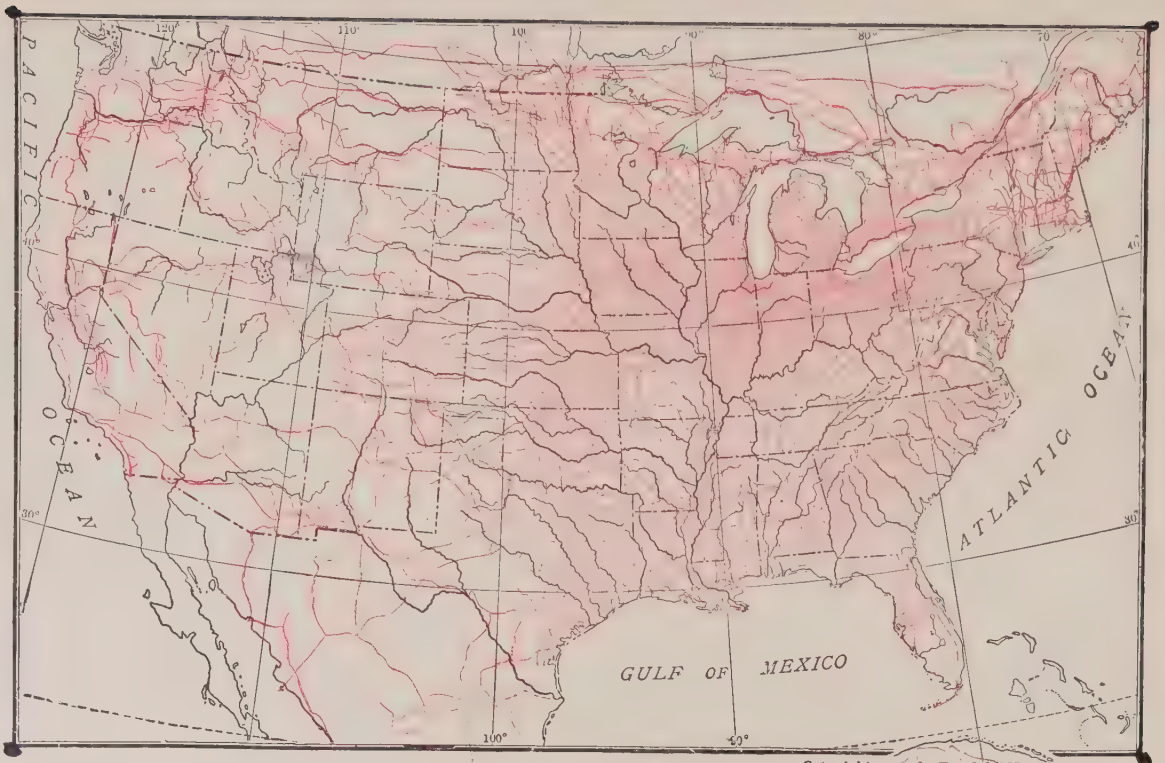


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FIG. 127. *Density of railways in the United States.*

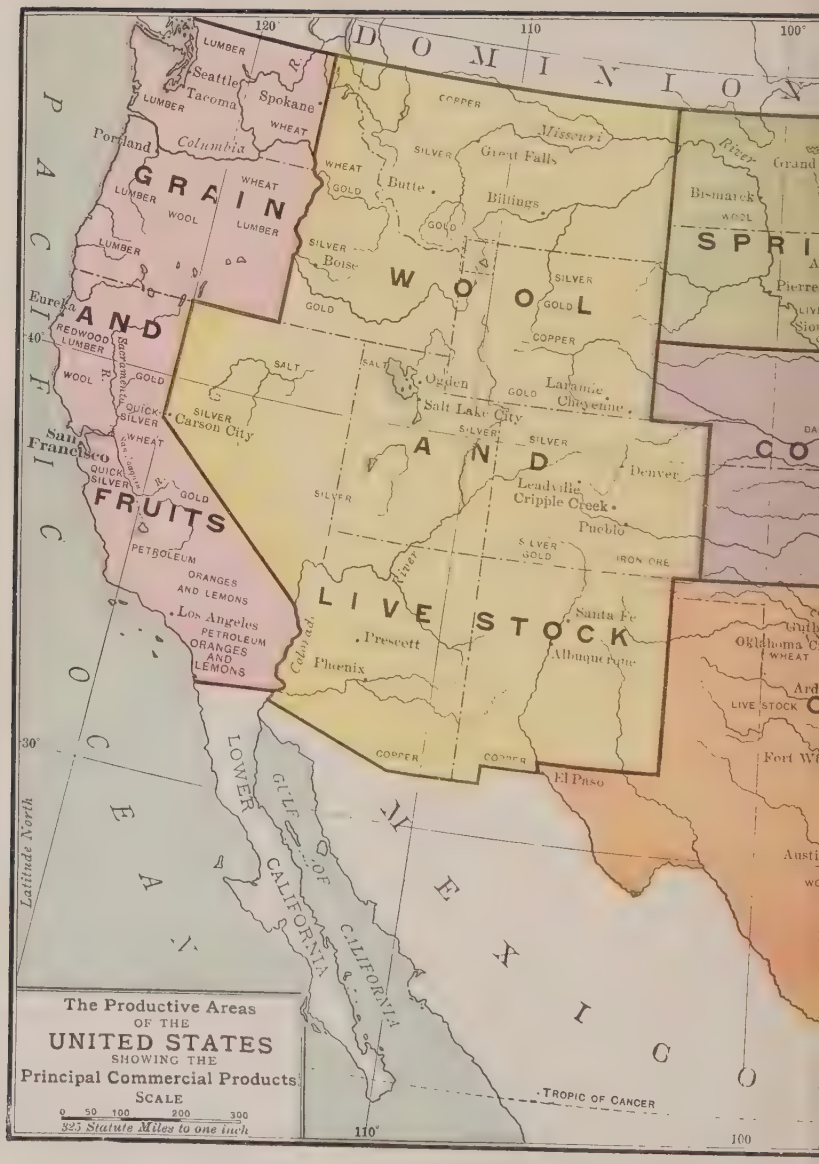
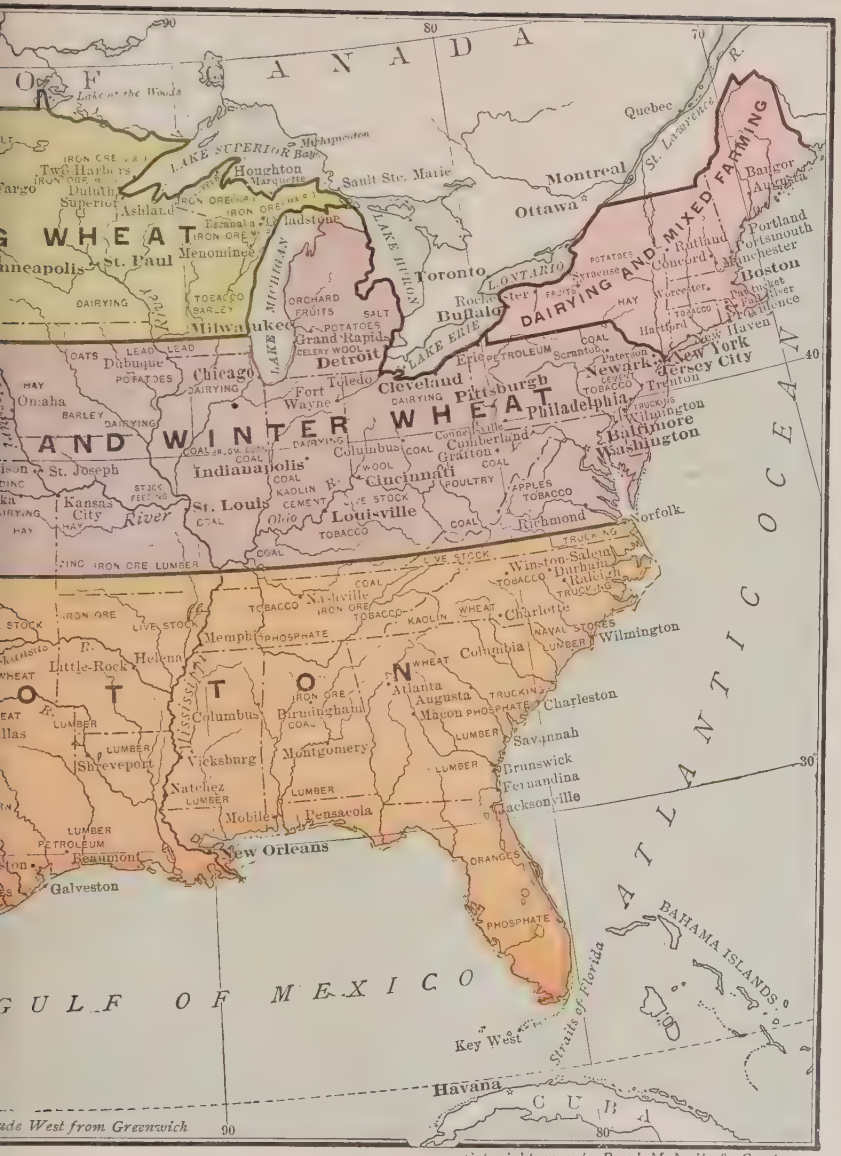


FIG. 128. *Areas in the United*



ude West from Greenwich

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producing commercial staples.

From Report of Industrial Commission

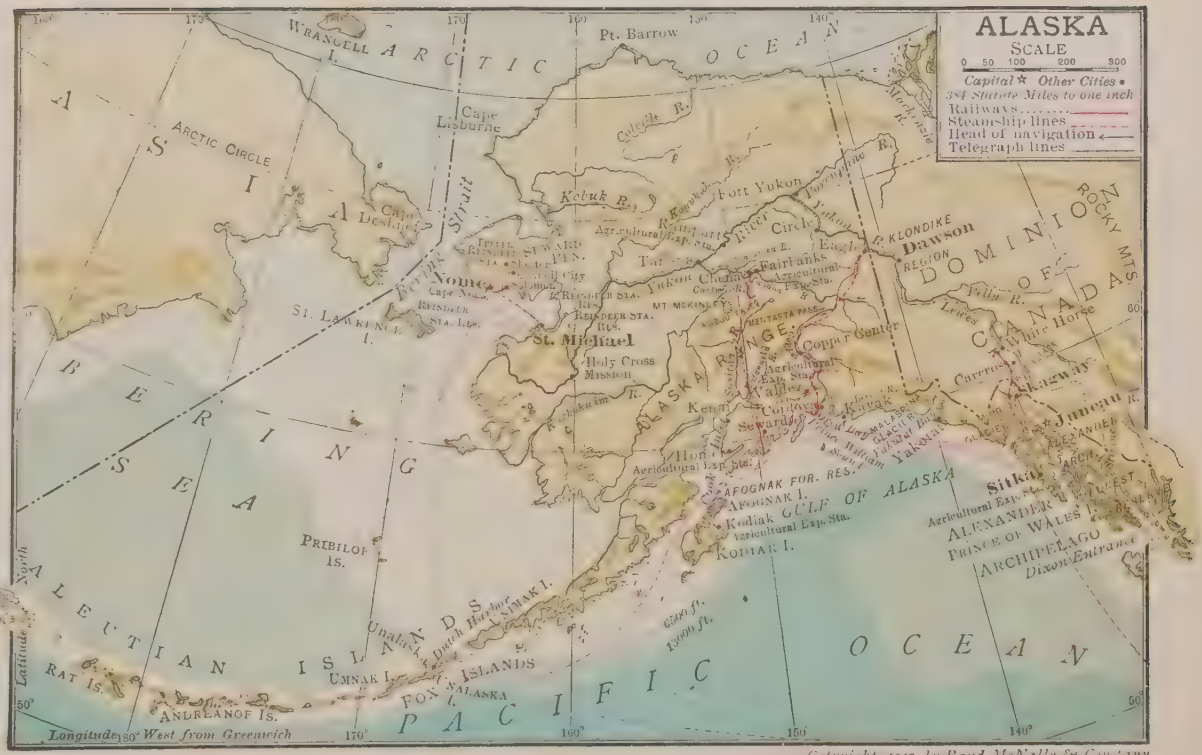

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FIG. 129. *Alaska.*

208. Forest Products. Forest products (Fig. 132) equaled in value about two-thirds the crude mineral products of the United States, as shown by the Fourteenth Census.

The exports of forest products consist mainly of yellow pine, turpentine, and rosin from the South, together with redwood and other lumber from the Pacific coast.

The imports consist largely of tropical "jungle" products. Under this head are included rubber and other gums, cabinet and dye woods, cork, and tanning agents, notably sumac from

After Thirteenth Census

FIG. 133. *Value of all crops in the United States.*

Italy and gambier from the East Indies. In addition, there is a growing importation of lumber and wood pulp from Canada.

209. Live-stock Products. Domestic animals yielded, according to the Fourteenth Census, products amounting to nearly one-third of all farm products. Dairy products, and beef cattle were each valued at more than $1,400,000,000 a year; while even the industrious hen was worth about ten times our annual output of gold. Hogs, sheep, horses, and mules also materially swelled the census totals.

However it may prove in the future, the introduction of

steam, gasoline, and electricity has not as yet materially affected the commercial importance of draft animals.

The exports of meat and other animal products on the whole exceed the imports, going to all the densely populated countries of Europe, especially to Great Britain. There is, on the other hand, a large import of raw materials of animal origin, notably hides, wool, raw silk, feathers, and bristles. There are besides growing imports of meat, eggs, and dairy products. The imports of hides alone amount to more than $150,000,000 a year.

210. Crop Products. The crops (Figs. 133 and 134) of the United States, as ascertained at the Fourteenth Census,

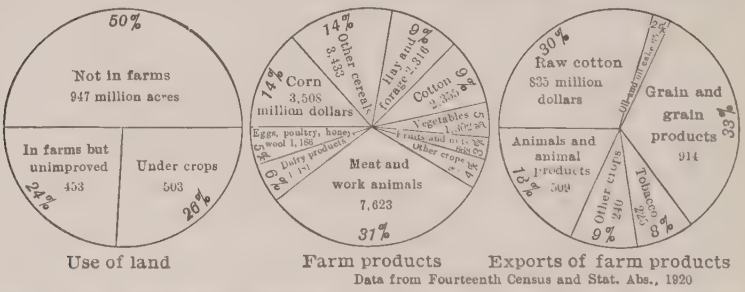
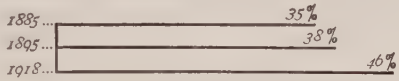


FIG. 134. *Agricultural industry of the United States. Totals: contiguous land area, 1,903 million acres; farm products at Fourteenth Census, 24,838 million dollars; exports (1920-21) 2,788 million dollars. The land not in farms comprises mountains, swamps, desert regions, roads, and cities.*

were worth over $14,700,000,000. One year's crops would thus more than pay for the Civil War. By far the most important crop, measured both by acreage and value, is corn. In fact, the corn crop of the United States almost equals in value the two crops next in rank—cotton and hay.

For export purposes, however, cotton is far and away the most important crop. The United States, indeed, furnishes the bulk of the world's cotton. (Figs. 84 and 85.) Next to cotton the principal export crops are wheat, both milled and unmilled; corn, mostly unground; tobacco; and fruits, chiefly apples and prunes. (Fig. 134.)

The imports of farm products are mainly of tropical or subtropical origin. The increasing dependence of the United States on tropical lands is indeed a very striking and significant fact. (Fig. 135.)

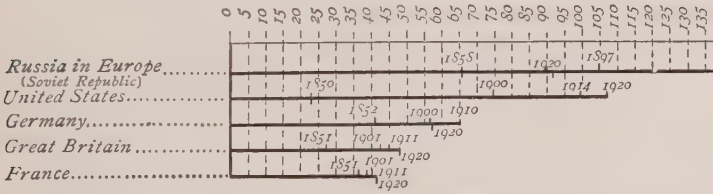


U. S. Statistical Abstract, 1918

FIG. 135. *Imports of tropical and subtropical products.*

The largest single item of agricultural imports is sugar, mostly from Cuba. Hitherto all the exports of wheat from the United States have hardly paid for the imports of sugar. Now, however, by virtue of its tropical possessions and beet sugar at home, the United States is in a position to build up a great sugar industry. (Fig. 278.)

The imports of coffee, largely from Brazil, rival and may soon exceed sugar in value; yet the Insular Possessions are admirably suited to coffee growing. As matters now stand, the United States buys from Brazil products that are worth from fifty to sixty millions a year more than Brazil buys from the United States. This trade, if distributed among the American possessions, Central America, and Mexico, where the United States finds a much better market, would increase the purchasing power of those countries and thus tend to enlarge still further the market for American products, especially American manufactures.



After Statesman's Year Books, and U. S. Census

FIG. 136. *Growth of population in the principal commercial countries. Figures at top indicate millions; figures on lines indicate dates.*

211. Why Agricultural Exports Have Begun to Decline. The farmers' mine; the soil, is not easily exhausted. If properly handled, it is indeed like the widow's cruse of oil.

Yet within a few years the United States will be largely dependent on Canada for timber; the stock industry of the

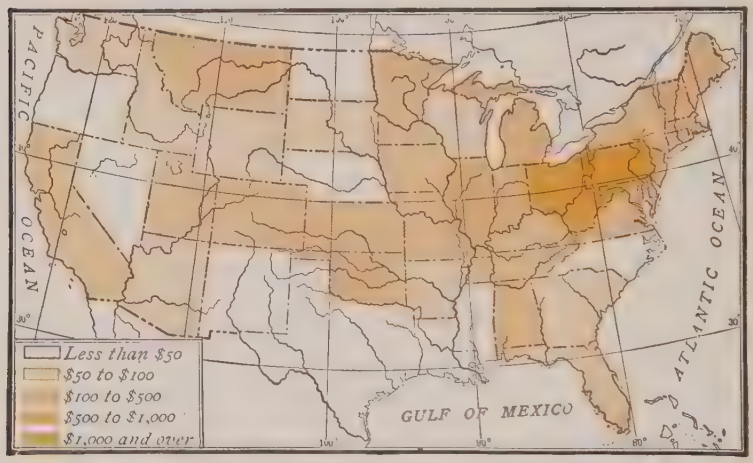


FIG. 137. *Value of minerals raised per square mile in the United States.*

West has already received a check through the overstocking of the ranges; wheat exports show a marked tendency to decline; and cotton has not kept pace of late years with the growth of population. Farm products in the aggregate still constitute, it is true, the largest single item, but twenty years ago they formed the great bulk of American exports.

This relative decline in agricultural exports is due to the law of decreasing returns in agriculture (§77), operating in the face of an unprecedented increase of population. (Fig. 136.) It therefore cannot be permanently checked, however intensively the soil may be cultivated.

212. Mineral Products. Agriculture and mining, the one exploiting the surface and the other the interior of the earth, are the two primary industries on which all others depend.

The mining industry of the United States has advanced, since 1880, with such giant strides as to distance both Great Britain and Germany. (Fig. 137.) This development has been furthered

by the use of the steam shovel in open-cut mines, and of power machinery for cutting and handling minerals in pit mines.

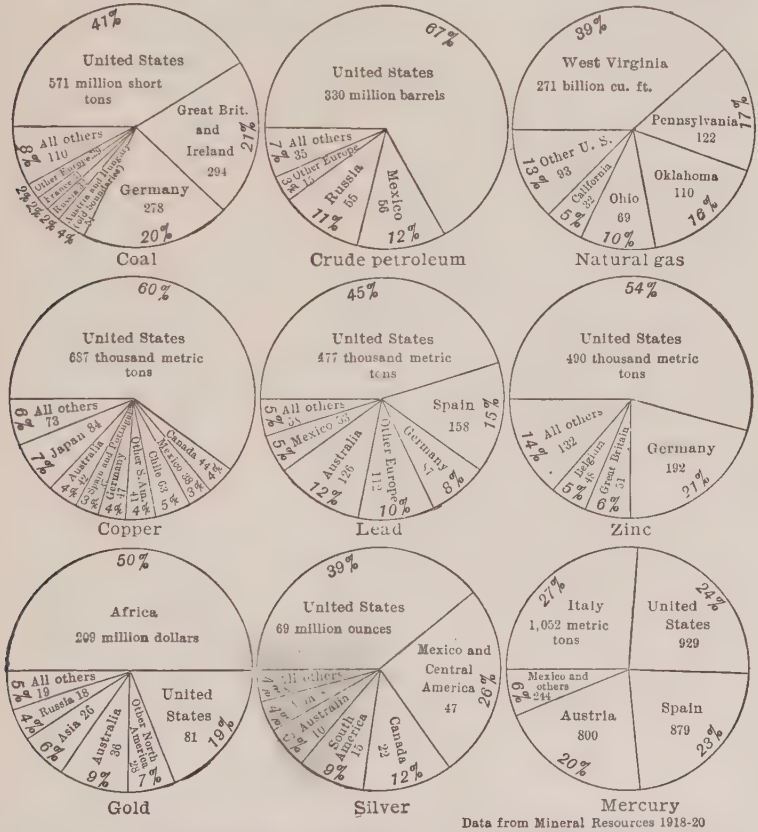


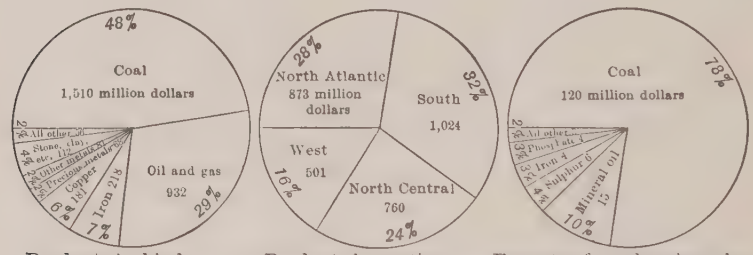
FIG. 138. *World production of minerals. Totals (averages for five years): coal, 1,399 million short tons (2,000 lbs.); crude oil, 491 million bbl. (42 gals.); natural gas (U. S.), 697 billion cubic ft.; copper, 1,156 thousand metric tons (smelter production); lead, 1,071 thousand metric tons; zinc, 913 thousand metric tons; gold, 20,207,199 oz. (417 million dollars); silver, 179 million oz. (151.4 million dollars); mercury, 3,904 metric tons (11.1 million dollars). (See also Figs. 282, 283, and 284.)*

The United States now holds first place, by a wide margin, in the output of mineral fuels, producing more than a third

of the coal, more than half the petroleum, and nearly all the natural gas used in the world. The United States is likewise first in the great industrial metals, iron, copper, lead, and zinc; also, in phosphate rock. (Fig. 138.) The United States is also well to the front in the output of gold, silver, and mercury, besides various minor minerals. (Figs. 137 and 138.)

The exports of crude minerals, on the other hand, consisting mainly of coal, phosphate rock, and petroleum, are largely exceeded by the imports of minerals not produced here in sufficient quantities (Fig. 139).

The true value of minerals, however, as of other raw materials, is only realized when they serve as the basis of



Data from Mines and Quarries, Fourteenth Census, and Com. and Nav. 1919

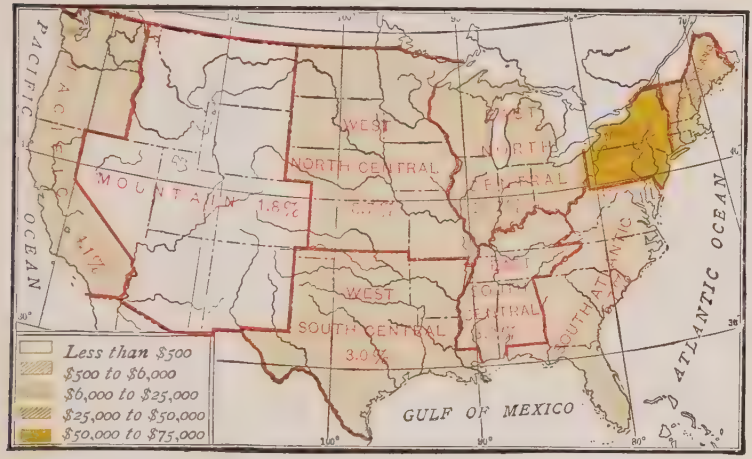
FIG. 139. *The mineral industry of the United States. Total (millions of dollars): products, 3,158; exports, 152.*

manufactures. A pound of unwrought iron is worth only a few cents; made into watch springs its value is multiplied many thousand fold.

[213] **Manufactured Products.** The American people have a natural mechanical bent; in fact, "the American loves a machine as an Englishman loves a horse." Already the value of American manufactures is probably double the value of all farm products. The United States is rated by some as the greatest manufacturing nation in the world.

Compared with Europe as a whole, however, which forms a substantially equivalent area, the United States is clearly in the "extractive" stage of industry, producing chiefly food and

raw materials. Even a major part of the articles that are classed in the United States Census reports as manufactures have undergone but little elaboration. Such articles are rough lumber, breadstuffs, meat, mineral oils, and many other commodities. Europe has thus far retained its preëminence in manufactures, despite the great resources of the United States, owing to an abundant supply of skilled labor and to superior educational facilities for industry and commerce.



After U. S. Census

FIG. 140. *Proportional value and density of manufactures by geographic divisions.*

Nevertheless, the proportion of manufactures among American exports has largely increased since 1885; and this increase extends not only to articles such as agricultural implements, encountering little competition abroad, but also to some lines of competitive manufactures, notably iron and steel products, copper wares, including electrical machinery, and leather goods, especially shoes. (Figs. 140, 141, and 142.)

214. Why Foreign Markets for Manufactures are Necessary. Since agricultural exports tend to decrease as population becomes more dense, and in any event manufacturing nations

are the more prosperous and powerful because not compelled to struggle ever harder against the law of decreasing returns (§77), the future commercial prosperity of the United States manifestly depends on the export of manufactured goods. (Fig. 142.) The United States must therefore obtain and maintain foreign markets for its manufactures, or undergo a gradual "process of suffocation," which would ultimately reduce the teeming millions of American workmen to poverty and lower the American standard of living to the European level.

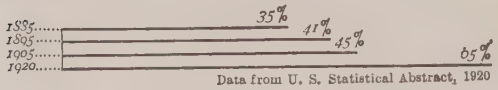


FIG. 141. *Growth of export trade of the United States in manufactures.*

215. Where Markets for Manufactures May be Found. Markets for manufactured goods are to be found in the future, not in Europe, which buys chiefly food and raw materials and, moreover, controls most of the very markets the United States seeks to acquire; but rather in the American Possessions, Canada, Mexico, South America, the Orient, and other countries which largely buy manufactured goods. (Table 6.)

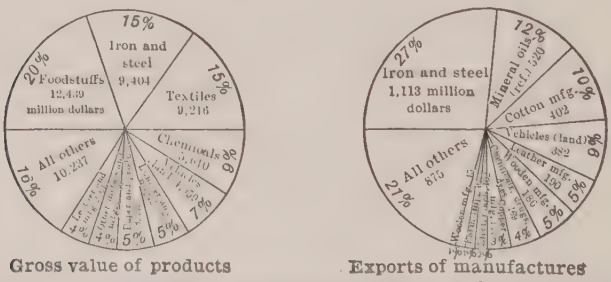


FIG. 142. *Manufacturing industries of the United States. Totals (millions of dollars): products, 62,418, Fourteenth Census; exports, 4,163 (U. S. Stat. Abs., 1920). Vehicles includes automobiles.*

It is in these same countries, moreover, where industry is relatively undeveloped and comparatively little capital has

been accumulated, that considerable investments of American capital have been made, especially in mines and railways, and still larger investments are certain in the future.

These countries, therefore, despite the present preponderance of Europe in American trade, are the ones in which the United States has the greatest interest, as markets for American manufactures and as fields for the investment of American capital.

216. The Conservation of Natural Resources. The resources of nature are indispensable to support the life of man, yet most of them are exhaustible.

The fisheries have long been declining; practically every merchantable tree in the United States has been counted; the highest grade Superior iron ores are largely exhausted, and the life of the remaining deposits is calculated at fifty years; the older natural gas and petroleum fields are clearly failing; and if the use and waste of coal shall continue to increase as during the last fifty years, the reserves of coking coals in the United States can hardly outlast the present century. Even the soil is suffering severely, not only from continuous cropping in staple crops like cotton, wheat, and corn, but perhaps even more from soil wastage, nearly a billion tons a year being swept into the streams and eventually carried into the sea. As Shaler puts it, "of all the sinful wasters of man's inheritance on earth, and all are in this regard sinners, the very worst are the people of America."

Such being the situation, what can be done about it?

Clearly, we cannot cease to utilize the resources of nature, for on them our life and our civilization depend; but if private interests can be in a measure subordinated to the public interest, it is possible to check the waste of these resources.

For one thing, by handling the remaining forests on scientific principles, and adopting a systematic policy of reforestation, much of the soil wastage may be avoided and the streams preserved for irrigation, navigation, and power purposes. (Figs. 8 and 143.)

Secondly, by substituting water transportation for carriage by rail, wherever practicable, the drain on the coal and iron mines may be greatly diminished. Rivers require no rails, nor do steamboats consume as much fuel per ton of goods moved as do locomotives.

Thirdly, by exporting manufactured goods, which represent a large value in relatively small bulk, rather than foodstuffs,

Courtesy of U. S. Forest Service

FIG. 143. *Reforestation of cut-over lands; successful natural seeding from long-leaf pine.*

raw materials or coal, the drain on both soil and mines may be lessened. It is indeed true that England's export of coal furnishes heavy outbound cargoes to offset the importation of foodstuffs and raw materials, when otherwise many ships would go in ballast. Full cargoes both ways tend to lower freight rates, which is one secret of England's success in foreign commerce. Nevertheless, every cargo shipped abroad hastens

the day of famine prices for coal at home. The need of conserving natural resources thus affords another and perhaps the greatest reason why the future prosperity of the United States depends on the export of manufactured goods.

Fourthly, more economical methods may be used in manufacturing. Thus, coke making as it has been carried on in the United States is an astonishingly crude and wasteful process. Fortunes are lost—not to speak of natural resources wasted—every year in the clouds of gas arising from the Connellsville coke ovens; and little use is made in this country even of the coal tar obtained in the process, notwithstanding it is the source of aniline dyes and many other widely used chemical products.

These and other economic reforms depend partly on aroused public sentiment, partly on the spread of technical education, and partly on changes in the law which will bring the interest of the owner and the interest of the public more nearly into harmony. The problem as a whole is too vast and complex for discussion here[1], but this much is clear: so long as the owner is taxed on the standing tree and the ore or coal in the mine, he will continue to make haste and waste, in order to get out what he can before the taxes consume his profits. On the other hand, if he were taxed only on the tree when cut and the ore or coal when mined, he would have every reason to use care and economy. The conservation of natural resources must therefore begin with a reform in the law of taxation.

[1] See the reports of the National Conservation Commission, the Inland Waterways Commission, and the Proceedings of the White House Conference of Governor's (Washington, 1909).

Tuesday

XV—AMERICAN EXPANSION IN THE PACIFIC

"The Pacific Ocean, its shores, its islands, and the vast region beyond will become the chief theater of events in the world's great hereafter."
—W. H. Seward.

217. The Character of Alaska. Alaska (Fig. 129) corresponds in position and climate to the Scandinavian Peninsula. Along the sea in the southeast the temperature seldom goes below zero. At Sitka the winter average (32.5° F.) is practically the same as at Washington, D. C. The interior, however, is drier, with warm summers and very cold winters.

The Coast Range of Oregon appears in Alaska in places as a string of islands, while the range representing the Cascades rises about one hundred miles inland. The Rockies also curve to the westward some distance south of the Arctic.[1] Most of the interior between the Alaskan and the continuation of the Rocky mountains is drained to the westward by the Yukon, a river larger than the Mississippi.

Alaska nearly equals in size the region east of the Mississippi and south of the Great Lakes, while in length of coast line, it exceeds the United States.

218. Fisheries and Forests of Alaska. Furs first attracted the Russians to Alaska, and are still of some commercial importance. The catch has, however, so far declined that fur farms have been established on several of the islands, containing the black, the blue, and the silver fox. Fur seals, which frequent the Pribilof Islands at certain seasons, were almost exterminated by Canadian and Japanese hunters, called "pelagic sealers," who shot male and female indiscriminately on the high seas, thus leaving the young to perish miserably of starvation. After several years of Government protection seals are now increasing. The sea otter, yielding the most expensive of all furs, is now very rare.

[1] Brooks, *Geography and Geology of Alaska* (U. S. Geological Survey).

Alaskan waters are among the most valuable fishing grounds in the world. The salmon pack is about twice that of the United States; the catch of halibut is much larger than in the Atlantic, some being shipped even to New England; and immense cod and herring banks are almost untouched. (Fig. 144.)

Based on U. S. Government Reports

FIG. 144. *Fisheries and minerals of Alaska.*

Heavy forests cover the coast east of Kodiak Island, where the southwest winds encounter lofty mountains. There is also a smaller and more scattered growth of trees on the slopes up to 2,000 feet elevation as far north as the Yukon.

These forests furnish timber for the mines. On the coast, where accessible to water transportation, they are also of probable commercial value.

219. **Mineral Resources of Alaska.** Gold has, however, proved the great magnet to populate the country, recalling the "days of '49" in California. Quartz mining is carried on around Juneau, where the Treadwell mine feeds the largest stamp mill in the world; placer mining prevails in the Yukon, Fairbanks, and Nome districts. The gravels are commonly washed by powerful streams of water driven against them (Fig. 145); but steam shovels and gold dredges have also begun

U. S. Geol. Survey, Bulletin, No. 328

FIG. 145. *Hydraulic elevator on Glacier Creek, Alaska. Water is pumped to higher level in order to give pressure for hydraulic mining.*

to be employed. (Fig. 120.) Tin is found on Seward Peninsula in commercial quantities; and there are immense copper deposits on Prince of Wales Island, and in the Copper and Susitna valleys, which may prove the richest in the world.

Besides metals, Alaska has abundant coal, both near the coast and on the Yukon, ranging from anthracite through an intermediate class of coking bituminous coal to lignite. The

coal in the Matanuska and Bering River fields is the best on the Pacific slope. Gypsum is worked near Juneau (now the

Courtesy of the Rev. Sheldon Jackson

FIG. 146. *Freighting with reindeer in Alaska.*

capital of the territory), and marble on Prince of Wales Island, both conveniently located for shipment by sea.

220. Agricultural Possibilities of Alaska. Furs and gold have filled Alaska with a floating population in search of fortune; only agriculture can establish homes. Moreover, if foodstuffs must continue to be imported, only the cream of the mineral deposits can pay expenses.

On the wide tundra or moss-covered plains in the northwest, beyond the Yukon, reindeer have been introduced by the Government as a means of saving the natives from starvation, now that game has become scarce. These promise to be of great value both for food and freighting purposes. (Fig. 146.) Unlike other domestic animals, they can "rustle" for their food, which they dig up from beneath the deepest snows.

The grass-covered islands, and seaward slopes from Kodiak Island west, are admirably adapted for pasturage. The Agricultural Experiment Station has found that cattle and sheep both thrive there.

The example of Norway, Sweden, and Finland, similarly circumstanced as to climate, indicates that agriculture should

be possible in Alaska. The sun shines in summer eighteen to twenty-two hours a day, setting at ten and rising before three on the lower Yukon (Fig. 171); and behind the Coast Range there is little cloudy weather, especially in the Tanana and Copper valleys. The temperature consequently reaches 90° F. with a summer average well above 50° F. The long hours of sunshine, combined with an unfailing supply of moisture from the thawing earth beneath, force vegetation to an extraordinarily rapid growth. It has been proved by experience at various places along the Yukon that barley, potatoes, and all common vegetables will grow at least as far north as the Arctic Circle.[1] At Rampart, indeed, grain, including wheat, has matured every year since the Agricultural Experiment Station was established there.

Alaska, with coal and food products, is an altogether different country from the "frozen waste" that some of the books still describe. To encourage settlement, Congress has made the homestead unit in Alaska 320 acres.

221. Commerce of Alaska. The exports (Fig. 147) of Alaska are chiefly fish (mainly salmon), copper, gold, and furs; the imports, foodstuffs, machinery, and mining supplies, mostly from the United States. Between Alaska and the United States there is entire freedom of trade. The commercial centers are

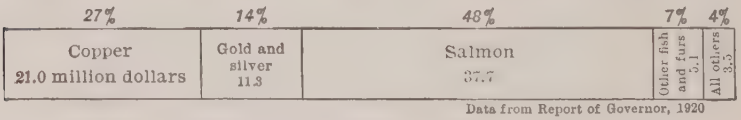


FIG. 147. *Exports from Alaska. Totals, five-year averages (millions of dollars): exports, 78.6; imports, 39.7.*

Ketchikan, Juneau, and Eagle in the rich mining district of southeastern Alaska; St. Michael, near the mouth of the Yukon; Nome on Seward Peninsula; and Cordova on Prince William Sound. Skagway, reached from Puget Sound by a sheltered

[1]Especially at Holy Cross Mission and Eagle. See McLain, *Alaska and the Klondike*, and the *Reports of the Alaska Experiment Stations* (Department of Agriculture).

"inside" passage behind the fringe of islands, offers the shortest route to navigable water on the Yukon. This is reached by a railway only 112 miles long, but with heavy grades over the mountains (2,880 feet). At Nome, the supply point of a rich gold-mining district, goods and passengers must be landed through the surf at heavy cost. Both Bering Sea and the Yukon River are as a rule icebound from October till June.

Courtesy of The Mining World

FIG. 148. *Traveling by dog sled in Alaska.*

222. Transportation in Alaska. Transportation is chiefly by water in summer, and by dog sleds (Fig. 148) in winter; for in Alaska the "freeze up" is the magic power which turns the marshy tundra into a solid road and makes of every stream a highway into the wilderness. The Government has built a pack trail from Valdez at the head of Prince William Sound to the Yukon, and a beginning has been made in constructing roads for wheeled vehicles; but the general lack of wagon roads and the resulting cost of transporting supplies prevents many rich mines from being worked.

There are two short mining railways on Seward Peninsula; a third extending from deep water on the Tanana to Fairbanks

and the adjacent camps; and another built to haul fish, on the southern coast. Of more general interest and importance would be an all-American line from the south coast to navigable water on the Yukon System. Two such lines have been undertaken: one from Cordova up the Copper Valley and over Mentasta Pass (2,900 feet); the other from Seward by way of the Susitna Valley and Caribou Pass (2,300 feet). This route was chosen for the government railroad authorized in 1914 to open up the coal and other resources of Alaska. Both terminal ports are always ice free, that of Seward being as deep and calm as an Alpine lake.

The Alaskan islands, stretching farther away to the west of San Francisco than San Francisco is from Maine, contain many admirable harbors, notably Dutch Harbor, a port of call on the way to the Yukon and Nome. Strange as it may seem, these islands lie near the "great circle" route from Puget Sound to Japan, and, offering sites for coaling and naval stations, they give the United States no mean advantage in the struggle for commercial and naval control of the Pacific.[1]

223. The Hawaiian Islands. The natives of Hawaii came, according to their traditions, from Samoa. They were converted (1820) by New England missionaries, who founded the American influence that finally led to annexation (1898). There would thus seem to be truth in the adage that "trade follows the missionary and the flag follows trade."

There are few sights in the world more beautiful than the Hawaiian Islands (Fig. 149), a group of emerald gems, rising abruptly from the deep sea, with towering volcanoes still marked at times by flashes of fire and pillars of smoke. Nine of the group are inhabited, having an area (6,449 square miles) nearly equal to New Jersey.

The latitude is that of Cuba; but the Japan current, which is cooler than the land, lowers the temperature several degrees (Honolulu, 74° F.), rendering it almost ideal, seldom lower than 52° or warmer than 92° F.

[1] See Rear Admiral Bradford's article on *Coaling Stations for the Navy* (*Forum*, Feb., 1899).

The lowlands, being alluvial, are as a rule extremely fertile; but irrigation is often necessary on the lee or southwestern side of the mountains, where the rainfall at sea level is, on the average, only thirty-two inches. This is inadequate in a warm country, where evaporation is very rapid. The uplands are cooler, moister, and less fertile. As in the lesser Antilles, the ports and towns are mostly on the side sheltered from the prevailing northeast trade wind.

224. Natural Resources of Hawaii. The mountains are still partly forested, though wasteful lumbering and herds of wild cattle and goats roaming at large have ruined much valuable timber. The adjacent lowlands have therefore suffered increasingly from drought, while the streams are less useful for irrigation. Recently the situation has grown so serious that several forest reserves have been established.

Fishing is now largely in the hands of Japanese. The catch is consumed in the islands. Stock raising is of some importance on the uplands, especially above the timber line (6,000 to 8,000 feet) where cattle, sheep, and horses all do well. Three of the smaller inhabited islands are private sheep and

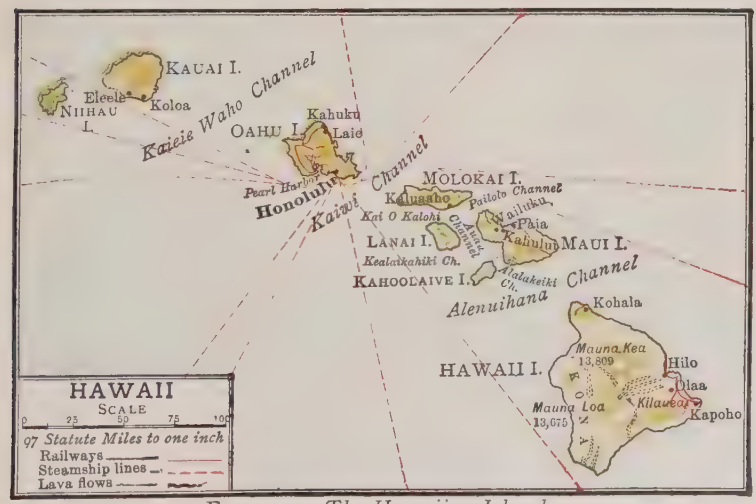


FIG. 149. *The Hawaiian Islands.*

cattle ranches. Owing to the rugged surface, only a small part (less than 5 per cent) of the land is under crops. The great commercial crop of Hawaii is sugar cane (Fig. 150), grown mostly on the lowlands (under 500 feet), though on the windward slope it ranges up to 2,000 feet elevation. It is irrigated on the southern slopes but grows without irrigation on the northern. Rice and taró, also irrigated, are the staple food crops. Taró is a root crop which takes the place of potatoes in the tropical islands of the Pacific.

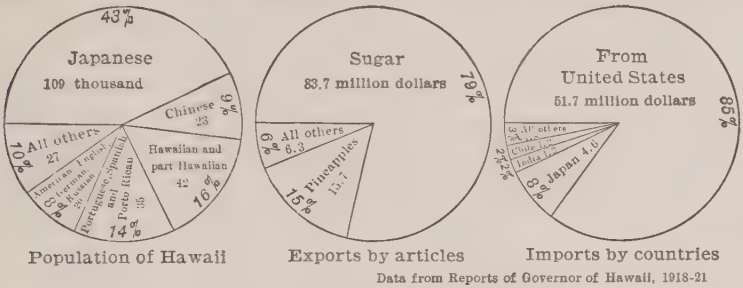
Other crops, that are becoming increasingly important, are pineapples, which flourish on dry lowlands; cocoa and bananas (the bananas shading the cocoa), vanilla, and rubber, all needing a moist climate and giving the best results under 500 feet elevation; coffee, tobacco, and vegetables on the uplands. Coffee does best on the drier side above 2,000 feet elevation, while tobacco thrives in the cloud-belt on the windward slope. Sisal fibre is a promising crop. Pineapples, bananas, and coffee have already reached a commercial basis. Most of the pineapples are canned for export, the value of the shipments reaching nearly $10,000,000 in 1920. One of the canneries, consuming

Courtesy of Professor H. W. Henshaw

FIG. 150. *Gathering sugar cane in Hawaii.*

250 tons of fruit a day, is reputed to be the largest in the world, surpassing even the great canneries at Singapore.

225. The Population of Hawaii. The sugar industry has filled Hawaii with Asiatics (Fig. 151); and still the sugar



Data from Reports of Governor of Hawaii, 1918-21

FIG. 151. *Races and commerce of Hawaii.*

Population at Fourteenth Census, 255,912. Commerce, five-year averages (millions of dollars): exports, 105.7, practically all to the United States; imports, 60.5, mostly foodstuffs and manufactures.

planters are not satisfied. Their laments about the "scarcity of labor" mean, what such laments usually mean the world over, a scarcity of people willing to work for a few cents a day (§74) Such "scarcity of labor" as this is a sign of a rising standard of living and therefore of real economic progress. On the other hand, only upland crops such as coffee and tobacco can support an American population There are estimated to be 350,000 acres at 2,000 to 5,000 feet elevation where coffee would thrive.

The preponderance of Asiatics in Hawaii can hardly be viewed with indifference. In all countries the race which furnishes the laborers tends more and more to crowd out the ruling race; for it is a fact observed in many lands that the so-called "upper classes" die out in time unless constantly recruited from the laboring classes or by immigration. Already the Asiatics in Hawaii have made their way into many occupations formerly confined to the whites.

226. The Commerce of Hawaii. Internal transportation is well provided for by highways, several short railways, and by coasting vessels. The several islands are connected by a wireless telegraph system, and the Pacific cable makes two

landings in the archipelago. Honolulu, the capital, is a modern city, with telephones, electric light, and electric cars.

Hawaii enjoys free trade with the United States, which consequently constitutes almost the sole market for Hawaiian products and furnishes the bulk of Hawaiian imports. (Fig. 151.) The importance of Hawaii for sea-borne commerce depends upon its unique position. It is the "crossroads of the North Pacific" and therefore a natural mid-ocean supply station. Its value is further enhanced by isolation; only small coral islands lie within a radius of 2,000 miles. (Fig. 195.) Moreover, it has in Pearl Harbor (Fig. 152) an ideal location for a coaling and naval station. Naval vessels cannot cross the Pacific without recoaling; hence Hawaii in American hands guards the Pacific coast of the United States better than a dozen battle ships.[1]

FIG. 152. *Honolulu and Pearl Harbor.*

With the Panama Canal completed, Hawaii becomes at once its western gateway.

227. American Samoa. The beauty of the Samoan Islands, clothed in the richest verdure to the mountain tops, the charm of their ever-balmy climate, the native courage, courtesy, and generosity of their people, have drawn from all beholders the most glowing tributes. Our youthful dreams of an island in the far southern seas where it is always summer and the burdens of life are laid aside, here seem to be realized. It was in Samoa that Robert Louis Stevenson, after wandering the world over, fixed his home and chose his last resting place; and his writings[2] have given it fame throughout the world.

In the division of the islands (1898), Germany received the two larger islands, now occupied by New Zealand, while the United States obtained the five small islands at the east,

[1] Mahan, *Interest of America in Sea Power.*
[2] *Footnote to History, Vailima Letters, etc.*

having an area of seventy-seven square miles and a population of 8,056. The largest American island, Tutuila, is seventeen by five miles in extent.

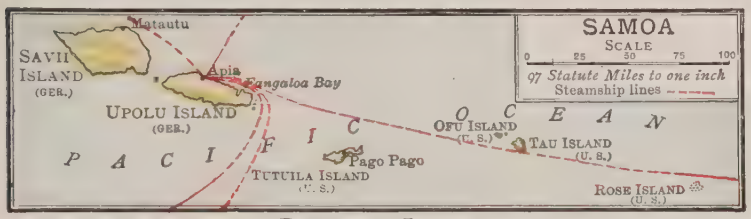


FIG. 153. *Samoa.*

The natives produce some copra, the dried meat of the cocoanut, for export. The real value of American Samoa, however, consists in its harbor and its location. The harbor of Pago Pago, a crater now invaded by the sea, is deep, landlocked, and easily made impregnable to attack. (Figs. 11 and 24.) Here a steel pier and coal sheds have been erected for the Navy. From Samoa the island chains radiate and the Polynesian peoples originally spread; and most of the commercial routes in the South Pacific pass close at hand. Samoa is, in fact, the "crossroads of the South Pacific." (Figs. 153 and 195.) Pago Pago is already a port of call on the steamship route from San Francisco to Australia; and it lies on one of the routes from Sydney to the Panama Canal.

Unfortunately, however, the surrender to Great Britain (1884–1892) of all the islands[1] lying between Hawaii and Samoa, most of which had been American for very nearly half a century, has rendered an all-American cable to Pago Pago

[1]Known as Guano Islands under a law passed in 1856. About seventy groups in all were occupied by Americans, including Fanning or America group, where the British cable now lands; the so-called Central Pacific Sporades; and the Manahiki, Union, and Phœnix groups.

Even Jarvis (or Howland) and Nantucket (or Baker) islands, where Commander Davis formally raised the American flag (1858), are now marked "British red" on some British maps; while the United States Department of State disclaims all knowledge as to their status. The Marquesas Islands, over which Captain David Porter raised the American flag during his famous cruise in the "Essex" (1813), were subsequently annexed by France (1842).

practically impossible. Yet despite the wireless, naval operations are in large part "an affair of coal and cables."

228. Wake and Guam. Wake Island, a coral reef barely rising above the sea, was annexed by the United States (1899) as a possible cable station; but Midway Island, a part of the Hawaiian chain, was finally used for this purpose.

FIG. 154. *Guam.*

Guam (Figs. 154 and 201) is the largest island (thirty-two by nine miles) between Hawaii and Manila, having an area of 210 square miles and a population estimated at 9,000. It is well wooded and fertile, exporting some copra. Under intelligent cultivation, it might readily be made an important source of cocoa. Provision has already been made for an agricultural experiment station there.

Guam was seized (1898) during the Spanish War, as a way station on the route to Manila. It is the cable center of the western Pacific, having the American cable to San Francisco and Manila, the Dutch cable to Yap and Menádo, and another cable to Japan. It is also a coaling station for the Navy; and is governed, like Samoa, by a naval officer.

Unfortunately, Guam has only an exposed roadstead where a naval vessel, the "Yosemite," has been lost, and where an artificial harbor could be constructed only at heavy expense. This is the more regrettable as the Caroline Islands, stretching across the Pacific for 2,500 miles just south of the route to Manila (Fig. 159), which might just as well have been occupied by the United States, contain a number of excellent harbors.[1] This group,[2] as well as the Mariannes, sold after the close of the Spanish-American War by Spain to Germany (1899), is now occupied by Japan.

[1]See Rear Admiral Bradford (*Forum*, Feb., 1899).

[2]Fifty small island clusters; area about 560 square miles; population 35,000 to 40,000. Area of Mariannes, aside from Guam, 270 square miles.

229. The Philippine Archipelago. It was indeed a strange chance, if chance it was, which brought the great Philippine archipelago, named in honor of a Spanish king, beneath the American flag (1898).

FIG. 155. *Rice terraces at Banaue, Philippines.*

The Philippine Islands (Fig. 196) are scattered over a region almost equal to that extending from Lake Superior to the Gulf of Mexico, and from Lake Michigan to the Atlantic; while their land area (115,026 square miles) exceeds New England and New York. Lying wholly within the Tropics, their climate is warm the year round (Manila, 81° F.) and very moist, especially in summer and on slopes exposed to the northeast trade wind (§51). In northern Luzon, however, around Baguio, the summer capital, there are extensive highlands 4,500 to 7,000 feet above the sea, where the temperature ranges from 40° F. to 80° F., and the climate is "like that of Vermont in early summer." These highlands are covered with grass, oaks, and pines; and it is here, if anywhere, that the white race

will make its home in the Philippines. Tropical highlands, however, lack one thing necessary to the full vigor of northern people—a tonic winter.

230. **The Inhabitants of the Philippines.** The natives are believed to number upward of 10,000,000, divided between Negritos (dwarf negroes), and Malays and further subdivided into twenty-four tribes speaking mutually unintelligible languages. Of these tribes eight, containing the bulk of the population, are Christian; fragments of several tribes are Mohammedan (Moros); and the others are heathen.

The mass of the people even in the most civilized tribes are densely ignorant; very few (10 per cent) even speak Spanish after three centuries of Spanish rule. Their standard of living is naturally low and their wants are few and simple. If they are ever to come in touch with the modern civilized world and develop an important commerce, they must learn English. An efficient system of public schools using English has therefore been established; and though it is admittedly a risky experiment in the Tropics, a very large measure of self-government has been granted, including an elective Philippine Assembly.

231. **Fisheries and Forests of the Philippines.** Nearly every native is said to be more or less a fisherman; everywhere fish and rice are the staple foods. The Sulu Sea also yields considerable quantities of pearls and pearl shells.

Over half the land is forest-clad, bearing many valuable tropical cabinet woods. Most of the forests are state property, and a scientific forestry system has been established. The natives make large use of the bamboo, a gigantic tropical grass sixty to one hundred feet in height, for building; the leaves of the nipa palm for thatching their huts; the rattan, which sends up thin whip-like shoots of great length, in place of ropes; the betel leaf and areca nut for chewing, in lieu of tobacco; while the fermented sap of various palms serves as wine. Of commercial importance are dammar and copal resin, both used in varnishes; rubber and gutta-percha, found

in the islands south of Negros; sapan wood, yielding a yellow dye; and the oil distilled from ylang-ylang flowers, which serves as the base of fine perfumes.

232. Agricultural and Mineral Products of the Philippines. The surface is mountainous; but the soil, being largely volcanic, is very fertile. Most of the people live from the land; though only a small part (less than 5 per cent) is tilled, and the methods of tillage are very crude. (Fig. 156.) For this reason much rice must be imported, coming largely from French Indo-China.

For local use the leading crops of the Philippines are rice in the lowlands, also in terraced fields (Fig. 155), corn in the uplands; besides sweet potatoes and fruits such as the banana and mango. For export purposes the principal crops

Permission of Philippine Photo Co.

FIG. 156. *Plowing rice field with carabao in the Philippines.*

are Manila hemp (abacá), grown chiefly from Manila south; sugar cane, also in the middle islands, especially Negros; tobacco in the Cagayán Valley of northern Luzon; and the coconut everywhere near the sea. The Philippines have a monopoly of Manila hemp (Fig. 157), which is indispensable for the best ropes, and are an important source of copra, from which coconut oil, used both in soap and in butter making,[1] is obtained. Crops of great promise are coffee on

[1] At Marseille, cocoa butter goes under the names of cocoaline and vegetaline.

the northern highlands; cocoa and vanilla in sheltered lowlands having a close, moisture-laden atmosphere; and spices in the

Permission of Philippine Photo Co.

FIG. 157. *Shipping Manila hemp in original bundles.*

islands south of Negros, where cinnamon, nutmeg, and pepper grow wild and ought therefore to thrive under cultivation.

Manila cigars are the "Havanas" of the Orient. Exquisite hand-woven fabrics are made from the pineapple fiber (piña) and the maguey, a species of century plant. There are also some native ropewalks, manufacturing cordage of Manila hemp.

The mineral resources embrace gold and copper, especially in the northern highlands; rich iron deposits, and coal equal to the best on Puget Sound, both widely distributed. The "pines and mines" of the Benguet Highlands are attracting a considerable American population, which will doubtless develop other industries than mining, as happened in California.

233. Commerce in the Philippines. During the rainy season nothing can be moved on land except on mud sleds. These are drawn by water buffaloes, which are the principal work animals of the islands. Owing to the lack of transportation facilities by land, most of the population is crowded together near the sea or on navigable water ways.

When the Americans took charge, there was one railway 120 miles long, Manila to Dagupan, accompanied by a telegraph line. This road has now built important branches; and other roads have been begun on several islands. To protect navigation, the Insular Government maintains lighthouses and coast-guard vessels. Finally, the Army has built a network (some 9,000 miles) of telegraph lines and cables connecting all parts of the archipelago. Most of these, as likewise the telephones, are now operated as a part of the postal service.

The Americans have also created modern machinery of exchange in the islands. The post office operates a Postal Savings Bank; and, to rescue the natives from the clutches of Chinese and half-breed money lenders who charged twenty to forty per cent a month, the Government has established an Agricultural Bank, which loans money in small sums at reasonable rates. New Philippine coins have also been minted, the unit being the peso, worth fifty cents. It is based on the gold standard, and is as stable in value as United States money.

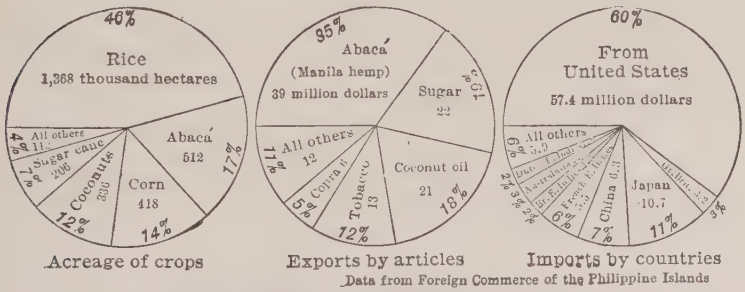


FIG. 158. *Crops and commerce of the Philippine Islands. Acreage, latest census, 2,953 thousand hectares (1 hectare equals 2.47 acres). Commerce, five-year averages (millions of dollars): exports, 113 (69.6% in 1920 to U. S.); imports, 95.5, chiefly manufactures and rice.*

The exports are chiefly abacá (hemp), sugar, coconut oil, copra, and tobacco; while the imports are, in the main, rice from the French possessions in Asia, and manufactures from Great Britain and the United States. (Fig. 158.)

To increase Philippine commerce, American or other outside capital must be invested so as to increase production. Imports must be paid for in the long run by exports, and increased exports must be based on an increased output of goods, which means the use of more efficient methods and machinery. This is more likely to occur since the Tariff Act of 1913 established free trade between the Philippines and the United States.

234. Seaports of the Philippines. The coast is extraordinarily indented. There are, indeed, over 3,000 islands, though only twelve of large size; but owing to the progressive rising of the land in parts of the archipelago, many of the harbors are shallow. The principal commercial ports are: Sulu and Zamboanga in the south; Cebú and Iloilo in the central islands, ranking respectively second and third in tonnage; Manila and Aparri, in Luzon.

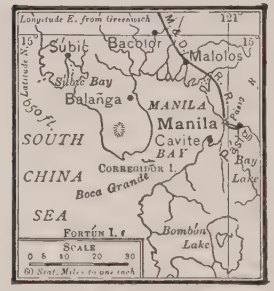


FIG. 159. *The site of Manila.*

The principal port for foreign trade is Manila, at the mouth of the Pásig River, which gives access to Lake Bay. A quaint mediæval city but a few years ago, Manila, under American rule, has rapidly taken on a twentieth century aspect. As the bay is shallow and exposed, the Insular Government has constructed an artificial harbor where the largest vessels can lie alongside the docks in any weather. This harbor is of more than local importance because many commercial routes pass the mouth of Manila Bay. (Fig. 159.) In fact, a circle struck from Manila with a radius of 1,500 miles will include nearly every important city from Shanghai to Singapore.

When Dewey's guns in Manila Bay sounded the death knell of Spanish dominion, they thus at the same time gave to the United States an "empire on which the sun never sets," and unbarred to American commerce the Gates of the Orient.

Hawaii 200,000 " " -Jap, China

XVI—AMERICAN EXPANSION IN THE CARIBBEAN

"The nation which controls the Isthmus of Darien is master of the world."—Sir Walter Raleigh.

235. **Causes of American Expansion.** The West Indies belong by position and interest to the United States rather than to Europe; but only since the Spanish War have the American people turned their faces to the sea.

Thomas Jefferson, indeed, looked forward to the time when Cuba should become American; but after Florida had been acquired (1819), the American flag paused at tidewater for eighty years, until the West was won, the issue of slavery settled, and a continent subdued to the uses of man. Toward the close of the nineteenth century, however, the rapid increase of population in the United States, the approaching exhaustion of free land outside the arid belt, and the growth of export trade in manufactures, all showed that the age of isolation was passing. It is during such periods of apparent stagnation that the forces gather which dominate the next generation. And so in 1898 the time was ripe, though we knew it not. The same war which opened the gates of the Orient battered down the walls raised in the West Indies by the Spanish colonial system, as formerly by the English, to secure a monopoly of their trade.

236. **The People and Government of Porto Rico.** Porto Rico was first colonized (1508) by Ponce de Leon, the same man who sought in Florida the fountain of perpetual youth. Though Porto Rico was less disturbed by revolts than Cuba, because smaller and more easily mastered, the Americans were nevertheless welcomed by the Porto Ricans (1898).

In Porto Rico as in Cuba the white people are in the majority, while in other West Indian islands hardly one person in a hundred is white. This startling difference results from the fact that of all Europeans who have colonized the West

Indies, only the Spaniards have become acclimated so that they are able (or at least willing) to endure manual labor in

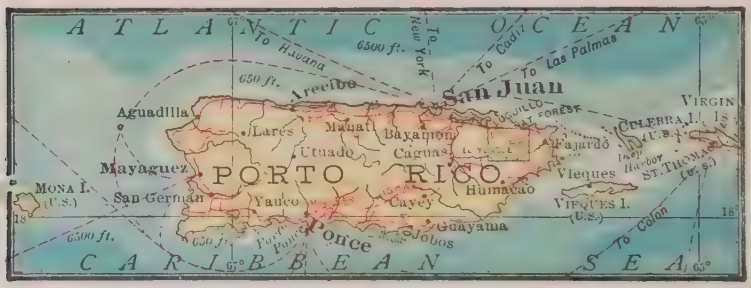


FIG. 160. *Porto Rico and its dependencies.*

the fields (§225). The poor whites (*Gibaros*) of Porto Rico are in large part peasant proprietors, a sort of "tropical backwoodsmen," while in Cuba the land is held in great estates.

Aside from the planter and professional classes, many of the people are entirely illiterate, with few wants and a rather low efficiency in labor; but a good system of public schools is now in operation. The language of instruction is increasingly English; but the island will no doubt remain Spanish-speaking, owing to home influences. The government is substantially that of an American territory, though customs duties accrue to the Porto Rican treasury. Between the United States and Porto Rico there is entire freedom of trade, except that all coffee imported into Porto Rico is taxed.

237. Surface and Climate of Porto Rico. Porto Rico (thirty-five by ninety-five miles in extent) is somewhat smaller than Connecticut. (Fig. 160.) The surface is rugged, reaching 3,600 feet elevation, but even the mountains are covered with a fertile clay soil. It is consequently the most highly-cultivated and most densely-peopled island of the West Indies, with the exception of Barbados.

The climate is of course tropical. The temperature varies but little throughout the year, San Juan having an average of 78.5° F. The rainfall is heaviest in summer and autumn,

as a result of the nearer approach of the equatorial belt of calms. It is excessive (120 inches) on the northern and eastern slopes, which are exposed to the full force of the trade wind, while irrigation is sometimes necessary for crops on the southern slope.

The cooler uplands and drier west have the largest proportion of white inhabitants. Because of climate, Mayaguez is the favorite residence of wealthy planters.

238. Products of Porto Rico. The mountains still bear patches of primeval forest containing cedar, ebony, and a non-fragrant variety of sandalwood. A National Forest Reserve has been established containing some of this primeval forest.

The higher slopes above 2,500 feet are largely cattle pastures; the middle slopes above 1,000 feet are occupied by coffee plantations, with some fields of upland rice, corn, and beans for local use. Owing perhaps to the fact that coffee is here planted at lower altitudes than in most tropical countries, it suffers unless well shaded. Tobacco also flourishes in the interior valleys of this zone. notably around Cayey, where it is grown to some extent under tents. The lower slopes and plains at the foot of the mountains grow sugar cane and a little sea-island cotton, while along the

Courtesy of Dept. of Agriculture

FIG. 161. *Branch of coffee tree with berries.*

shore is a fringe of coconut groves. Goats are everywhere, the goat being, so to speak, "the poor man's cow."

The growing of fruits, especially the orange, pineapple, and grapefruit, is a flourishing industry on the lower levels.

Coffee was the leading crop under Spanish rule; moreover, most of the island being mountainous, it is better adapted to coffee than any other crop. The Porto Rican coffee (Fig. 161) is of a very high grade; but, as a result of the Spanish War, it lost the Spanish, without gaining the American, market. Coffee was furthermore the mainstay of the small white farmers in the uplands, while sugar cane, which has largely increased its acreage under American rule, means great estates worked

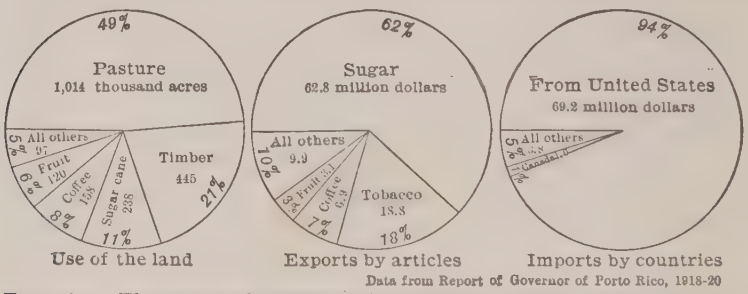


FIG. 162. *The crops and commerce of Porto Rico. Totals: land (1918–19), 2,072 thousand acres; commerce, three-year averages (millions of dollars): exports, 101.5 (88% to U. S.): imports, 74.0, largely foodstuffs and manufactures.*

by negro labor. (Fig. 162.) If the white farmers are not to be driven from the island, thus converting it into another Haiti, the coffee industry must be preserved and extended. Fortunately, the worst of the coffee crisis seems to be past.

Manufactures are limited in the main to sugar, cigars, and cigarettes, rum distilled from molasses, and "Panama" hats.

239. The Commerce of Porto Rico. Porto Rico under Spanish rule "had attained the fullest possible development of the ox-cart and wooden-plow civilization." Any further advance consequently depends on modern machinery and means of transportation.

The Spaniards did, however, build one good military highway (Fig. 163), and the Americans have added a considerable

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FIG. 163. *Military road in Porto Rico—a macadamized highway from San Juan to Ponce.*

mileage of macadamized roads. There is now regular automobile service between San Juan and Ponce. These cities are also connected by a belt line of railway along the coast, and are provided with electric cars and electric lights. The multitude of rushing streams offer power sufficient, if utilized, to operate all the railways needed in the island, including electric lines from coast to coast.

The coast line of Porto Rico is singularly unbroken. Even the harbor of San Juan, the principal city, is small and dangerous to enter in rough weather, though securely landlocked. Ponce is an inland town, at the edge of the foothills opposite the lowest pass in the mountains, and its playa, or port, is poorly sheltered. Curiously enough, the best natural port in the island, Jobos, in the southeast, lies almost untenanted. San Juan has become an important port of call for steamers making the circuit of the Lesser Antilles; and, by reason of its exports of coffee and tobacco, it may become a

port of call between Europe and Panama, though located a little off the direct route which passes eastward of St. Thomas.

Porto Rico, moreover, affords an American foothold nearly a thousand miles east of Florida. It unfortunately lacks a good harbor fronting the Mona Passage into the Caribbean; but the dependent[1] island of Culebra—Stevenson's "Treasure Island," beloved of every boy—has in Deep Harbor (Enseñada Honda) a splendid port commanding the Virgin Passage to the east of Porto Rico, and serving as the American naval headquarters in the eastern Caribbean.

240. Relation of Cuba to the United States. At the outbreak of the Spanish War (1898) Congress disclaimed by the Teller "self-denying" resolution any purpose to annex Cuba. The opportunity looked forward to since the days of Thomas Jefferson was thus put aside. The Platt Amendment, however, subsequently embodied in a treaty, established a virtual protectorate.[2] It also provided for the leasing to the United States of naval stations at Guantánamo, on the Windward Passage, and Bahia Honda, west of Havana. Guantánamo guards the route from all the Atlantic ports of the United States to Panama, while Bahia Honda commands both entrances to the Gulf of Mexico.

The motto on the seal of Havana—"The Key of the New World"—was thus no idle boast. By virtue of its position,[3] Cuba is of the greatest importance for the control of the Gulf of Mexico and the Caribbean, which together constitute the "American Mediterranean."

[1]Five other small islands were ceded with Porto Rico, the largest being Vieques or Crab Island.

[2]The provisions are in brief that the United States will not permit a foreign attack upon Cuba. In return for this protection, Cuba agrees to maintain sanitary conditions, to lease naval stations to the United States, and neither to alienate territory to any other nation nor to incur excessive debts which would cause international complications. The United States has the right to intervene if public order is seriously disturbed or if these promises are not kept. This right has already been exercised on invitation of the Cuban government, which found itself unable to suppress an insurrection.

[3]Mahan, *Interest of America in Sea Power.*

241. "The Pearl of the Antilles." Cuba (Fig. 164) is nearly a thousand miles long, and in land area slightly larger than Pennsylvania.

A range of low mountains traverses the west, a hilly belt continues through the center, while along the eastern end a lofty range rises abruptly from the sea. On the whole, the surface is fairly level and the soil exceedingly productive. By reason of its fertility, Cuba fully merits its Spanish title, "The Pearl of the Antilles."

The climate is similar to that of Porto Rico (§237), but slightly cooler (Havana, 77° F.) by reason of latitude.

Cuba was colonized by Spain a century before the Pilgrims landed at Plymouth; and the white population is almost

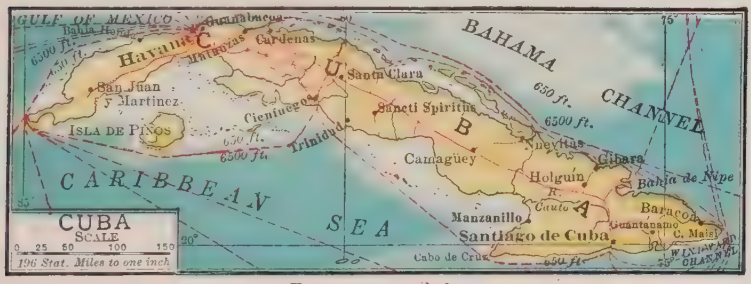


FIG. 164. *Cuba.*

exclusively of Spanish descent. Americans have made several settlements in recent years and have acquired not a little landed property; but by far the largest immigration is still from Spain.

242. The Products of Cuba. Considerable forests still remain, producing mahogany, Spanish cedar, used in cigar boxes, and dye woods. The principal dye woods are fustic or mora wood, dyeing yellow; and logwood, yielding dark colors. The forests are largely in the eastern end, around Santiago.

The earliest colonial industry was cattle raising. This still prevails in the uplands of the east and center, wherever remote

from railways. Hides and other animal products are exported, including considerable honey and beeswax from wild bees.

FIG. 165. *Field of sugar cane with central mill in Cuba.*

For a century (after 1727) coffee, introduced by French settlers from Martinique, was the principal market crop; but other products proved more profitable, though the eastern mountains offer ideal conditions for it. Since 1903, a high tariff has somewhat stimulated coffee and cocoa growing.

During the last century sugar cane has become the great staple crop of Cuba. (Fig. 165.) In other islands the sugar industry has decreased because of the competition of European beet sugar, aided by government bounties; but in Cuba the rich limestone soils of the central provinces, where cane need be replanted but once in seven years, aided by modern machinery, have made good the unequal struggle against beet sugar. Cuba is by far the greatest exporter of cane sugar. (Fig. 278.)

Next to sugar, the leading Cuban crop is tobacco, which was apparently indigenous to the island. Here, as in most parts of the Tropics, tobacco is a winter crop, being planted in the autumn and cut in the early spring. The best quality, though not the largest quantity, is grown in a small district, some twenty by eighty miles in extent, on the southern slope west of Havana. This is the famous Vuelta Abajo tobacco.

Other crops of value are bananas and coconuts in the east,

especially around Baracoa, and pineapples along the northern coast west of Hanava, as also on the Isla de Piños. Oranges grow wild all over the island, while lemons from the eastern districts are equal to the best from Sicily.

Around Santiago are important mines of iron and manganese; also copper mines, which once had the largest output in the world. Along the northern coast near Cardenas are considerable deposits of asphaltum.

Manufactures in Cuba, as in Porto Rico, are limited to sugar, tobacco, rum from molasses, and plaited straw hats.

243. The Commerce of Cuba. Wagon roads hardly exist in Cuba outside the cities. There are, however, more than 800 miles of plantation railroad, used in hauling cane to the mills for grinding. It is to these roads and these huge mills, costing a million dollars each, that the sugar industry of Cuba owes its continued existence. (Fig. 165.)

There are also upward of 2,500 miles of public railway, including a trunk line from Havana to Santiago with branches to the two coasts. Havana and other cities have in addition extensive electric lines run in part by water power.

U. S. Bur. For. and Dom. Com. and Cuban Dept. Agri.

FIG. 166. *Races and commerce of Cuba. Population, latest reliable estimate 2,468 thousand; commerce, two-year average (millions of dollars): exports, 571 (74% to U. S.); imports, 351, mostly foodstuffs and manufactures.*

The coast of Cuba, having a belt of resistant limestone near the sea but weaker rocks inland, contains many deep indentations of a singular bottle shape. Commerce thus "passes out

at a hundred gates." Moreover, these landlocked harbors with narrow entrances are admirably adapted for defense, as was clearly demonstrated during the Spanish War.

The principal commercial city of Cuba and the metropolis of the West Indies is Havana, at the northernmost bend of the island, less than one hundred miles from Key West. Santiago in the east, Cienfuegos in the south, and Camagüey in the interior, rank next in importance. Bahia de Nipe is the northern terminus of the Cuba Railway Company and here Antilla has been founded under American influences.

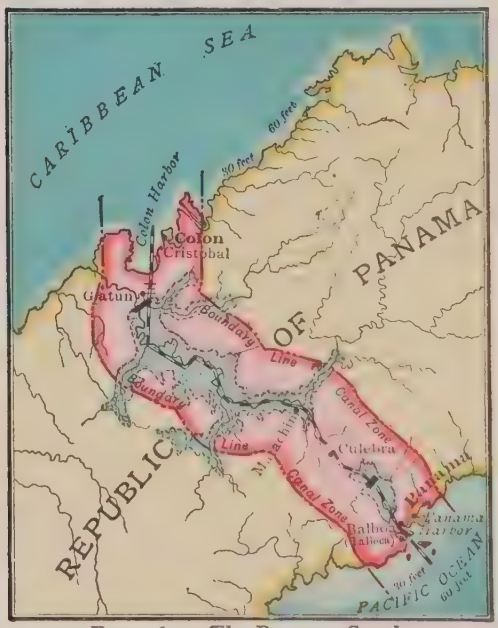


FIG. 167. *The Panama Canal.*

Cuba and the United States seem formed by nature for mutual dependence, each producing what the other needs. Since the reciprocity treaty of 1903, the exports of Cuba have gone mainly to the United States and the imports of foodstuffs, lumber, and fuel have come mostly from this country. (Fig. 166.) But the merchants of Cuba are, as a rule, Spaniards, and many of the imports of manufactures still come from Europe.

244. The Relation of Panama to the United States. When Panama gained its independence from Colombia (1903) it promptly granted to the United States, by treaty: (1) the same rights conferred by the Platt Amendment (§240), together

with sites for coaling and naval stations; (2) a strip ten miles wide along the canal, called the Canal Zone (Fig. 167), together with four islands near the Pacific end of the canal; and (3) the right to erect fortifications. Moreover, Panama was expressly placed under the protection of the United States, though it is still recognized as an independent state.

The United States has thus planted firm foot on the neck of land known to Sir Walter Raleigh as the "Isthmus of Darien," where men of imagination have never ceased to dream of a canal to reunite the severed oceans.

245. The Republic of Panama. Panama, the latest born of American republics, was called by the Spaniards "the grave of the living." Extending east and west, in the lee of South America, the isthmus is not exposed to the full sweep of the trade wind; moreover, it comes in summer under the belt of calms and heavy rains which accompanies the sun. The air is thus stagnant and reeking with moisture, and the Caribbean coast has long been one of the plague spots of the world: though it must be said that the Americans have revolutionized health conditions in the Canal Zone.

Because of the climate, though Panama closely approaches Indiana in size, its native population is small and composed mainly of Indians, negroes, and half-breeds.

In the matter of resources, Panama compares favorably with most of tropical America, having large forests of cabinet woods and dyewoods, uplands well suited to grazing and coffee growing, and fertile soil on the lower levels which will produce all tropical crops. There are also valuable pearl beds in the Bay of Panama, and deposits of gold and coal not yet exploited. The principal exports are tropical fruits, especially bananas and coconuts.

In Spanish days the colossal treasures of Peru, which for a time rendered Spain the mightiest power in Europe, were carried across the isthmus on mule back. After the discovery of gold in California, the first transcontinental railway in America was built from Colon to Panama (1855). This road, now

belonging to the United States, is only forty-seven miles long, and has a summit level of only 271 feet between the oceans.

FIG. 168. *Panama Canal excavated to grade at Matachin.*

There is also a pipe line across the isthmus for the transportation of petroleum. It is, however, as the site of the interoceanic canal that Panama is now most important to the United States and the world.

246. The Panama Canal. Each northern continent is paired with a southern; on the intervening narrow stretches of land and water converge the great lines of commerce. Since Suez was pierced, the Isthmus of Panama was the greatest obstacle to the direct course of world commerce.

The opening of the Panama Canal[1] consequently meant a revolution in world commerce. (Figs. 168 and 169.)

In the first place, the cheapening of freights has stimulated the growth of industry, and therefore of commerce, on all the shores of the Pacific. In anticipation of this result, new transcontinental railroads have been built to the Pacific in Canada, the United States, Mexico, and Central America.

[1] Dimensions: total length (including locks, etc.), 50.56 miles; width (at bottom): minimum, 300 feet, maximum, 1,000 feet; depth, minimum, 41 feet; summit level, 85 feet above mean tide. (*Official Handbook of the Panama Canal*, 1913.)

Secondly, San Francisco has been practically as near by sea to Liverpool as to New York, while all the west coast of South America (which continent lies wholly east of Florida), was in effect nearer to Europe than to New York. The Panama Canal now makes the United States a next-door neighbor of Peru and Chile, and ought to give the Atlantic and Gulf ports of the United States decisive commercial advantages as far west as Sydney and Hong Kong, perhaps even to Singapore. (Fig. 169.) The Panama Canal will thus tend to reverse the

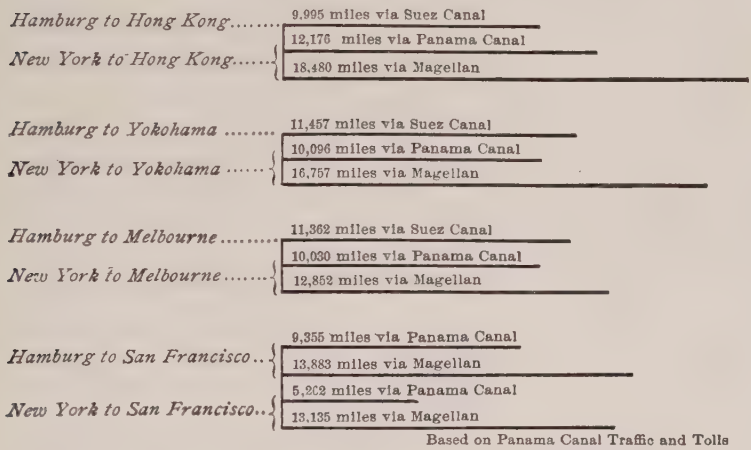


FIG. 169. *Effect of Panama Canal. Comparative distances from Hamburg and New York to Pacific ports before and after opening of the Panama Canal.*

historic direction of oriental commerce, drawing it east in place of west from China and Japan, causing Manila, San Francisco, Balboa (Fig. 193), and New York to rival Singapore, Calcutta, Port Said, and London. In the long run, therefore, the commerce that London lost and the Mediterranean ports gained when the Suez Canal again sent the current of oriental commerce through the Mediterranean, as before Vasco da Gama, will be in part transferred to America by the Panama Canal.

Finally, the American fleet, having the power of quickly

concentrating in either ocean,[1] will be nearly doubled in effectiveness; provided always the strategic positions commanding the approaches to the Isthmus are secured and strongly held. Now that the canal is open, Panama has virtually become a part of the United States coast line, and in fact the most vulnerable part, being the vital link between the Atlantic and Pacific slopes, the meeting point of two oceans and two continents. (Fig. 170 and *Frontispiece.*)

246½. St. Thomas, American Naval Base. In view of the necessity of controlling the approaches to the Panama Canal for its adequate protection,[2] American diplomacy was directed for a number of years toward securing by purchase the Danish islands in the West Indies. In 1916 the treaty of purchase was ratified by the Congress of the United States, and in 1917 accepted by the Danish government after a vote of the people. The purchase price was $25,000,000.

Of the three islands secured, St. Thomas, St. John, and Ste. Croix, St. Thomas is strategically the most important. It has an excellent harbor and lies directly on one of the great sea routes from Europe.

[1] How important this consideration may become was shown during the Spanish War by the sensational voyage of the "Oregon" around South America to reinforce the fleet in the West Indies.

[2] To insure the safety of the canal, neutralization has been proposed; but this would simply give all nations joining in the guarantee the right to land troops at the canal for the alleged purpose of upholding its neutrality. On the other hand, while fortification has been decided upon, it is difficult to make effective; for the Gatun Locks are within easy cannon range of the open sea.

Writers like Captain Mahan, the great authority on sea power, and Rear Admiral Bradford are therefore agreed that, in order to be secure, the United States must control the approaches to the isthmus from both directions. This fact gives great value to the Dutch West Indies and the Galápagos Islands in the Pacific, as well as to Magdalena Bay in Lower California. (Figs. 181, 182, 194.)

XVII—CANADA AND NEWFOUNDLAND

"Daughter am I in my mother's house but mistress of mine own."—Kipling.

247. The Making of Canada. The fur trade was at once the foundation and destruction of French Canada, for it left the colony without a solid basis in agriculture.

English Canada practically began with the American Revolution, which drove to New Brunswick and Ontario thousands of loyalists, including many belonging to the educated and property-owning classes of the revolted colonies.

Convinced by the Papineau Rebellion (1837) and the discontent even in the English-speaking provinces that repression would again lead to revolution, the British Parliament conceded provincial, and later (1867) federal, self-government. The nine provinces now correspond to states of the American Union; and the Canadian Parliament possesses practically all the powers exercised by any independent nation, except the control of foreign relations. Canada, contributing not a penny to the British treasury, thus enjoys most of the benefits with few of the burdens of independence.

Recently the last British soldiers have been withdrawn from Canada, leaving the fortresses manned by Canadian troops.

248. Surface and Climate of Canada. Kipling's reference to Canada as "Our Lady of the Snows" has helped to fix in the public mind an utterly false conception of the country. It is perhaps an echo of Voltaire's assertion that "all North America is not worth fighting for, being only a few acres of snow."

The fact is that Canada extends from the latitude of Rome to that of North Cape in Norway; its total area exceeds that of the United States including Alaska; and even deducting the Arctic barrens, the part fit for agriculture (1,700,000 square miles) equals the United States east of the Rockies. (Fig. 180.)

The long hours of sunshine (Fig. 171) in summer, together with the warm winds from the Pacific, push the limits of grain

and of trees a thousand miles to the north in western Canada, preserving the great plains there for the uses of civilization. (Figs. 78 and 180.) The smaller evaporation and somewhat larger summer rainfall also cause the broad arid belt to fade out toward the north. As a result, while the Canadian Pacific traverses several hundred miles of country east of the Rockies where irrigation is essential to agriculture, the new Grand Trunk Pacific passes to the northward of the dry lands.

Such a country can readily support 50,000,000 people and perhaps many more. It is well clearly to recognize the fact that Canada is fitted both by the character of its

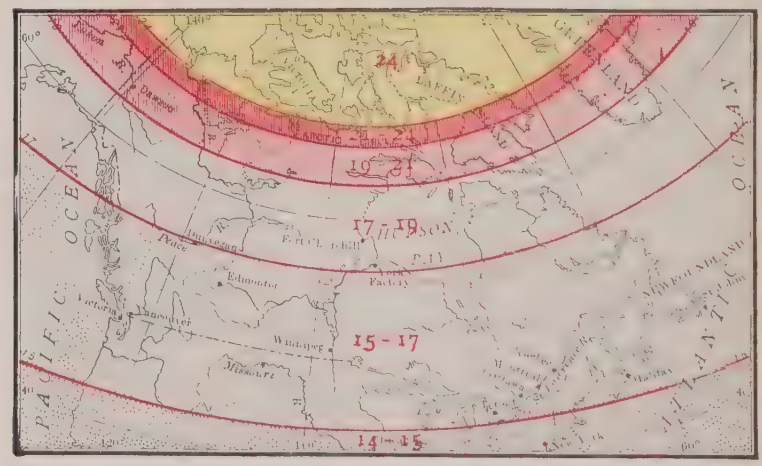


FIG. 171. *Possible hours of sunshine in July.*

inhabitants and by its resources to be the one serious rival of the United States in the western hemisphere.

249. Canadian Fisheries. The rich fisheries of the eastern coast first drew the attention of Europe to that region. The center of the fishing industry is still in the eastern maritime provinces, where the wide submarine plateau, the Arctic current, and indented coast offer special facilities. (Fig. 65.) The principal fishing port is Halifax. The species caught are,

as in the United States, chiefly cod, haddock, herring, mackerel, and lobsters in the Atlantic; whitefish and lake trout in the Great Lakes; salmon in the Pacific. The men employed are, relatively, far more numerous than in the United States.

250. The Fur Trade in Canada. Fur-bearing animals still abound in the vast subarctic forest, the most valuable being the beaver, sable, marten, and the rare silver and black foxes. The trappers are with few exceptions Indians or half-breeds. Stations of the Hudson Bay Company are scattered along all the northern rivers. In the northwest, the chief outfitting station is Edmonton, at the head of navigation on the north Saskatchewan, whence a short trail, recently replaced by a railway, leads to the Athabaska. The fur traders follow the water ways, using canoes in summer, dog sleds and snowshoes in winter. Fur farming has also become an important industry, especially fox farming on Prince Edward Island.

251. Forest Products of Canada. Early in the nineteenth century lumber succeeded fur as the leading product of Canada.

The lumbering industry has four principal centers: New Brunswick, where spruce prevails; the St. Lawrence basin, where the Ottawa delivers pine to the mills at Chaudière Falls and the Saguenay brings down birch for the mills at Quebec; the Georgian Bay region, where there is still some pine; finally, the Pacific coast, where the Douglas fir is the most valuable timber.

252. Farming in Eastern Canada. Agriculture is now the leading industry of Canada, furnishing by far the largest share of her exports. (Figs. 173 and 174.)

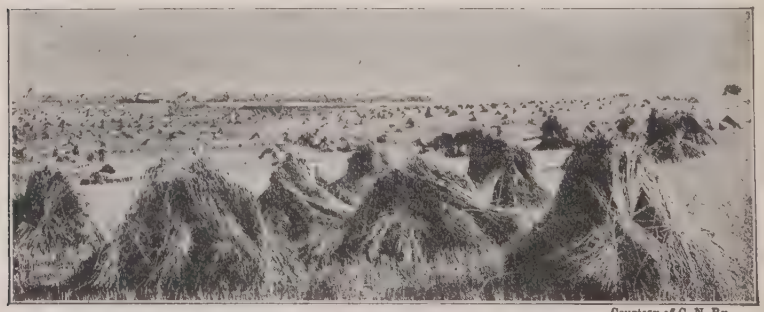
The eastern provinces south of the St. Lawrence reproduce the soil and climate of New England, though the part of Nova Scotia along the Bay of Fundy, being shielded from north and east winds, is 6° F. warmer than Boston. This is the Acadia of the French, where the scene of "Evangeline" is laid. Besides this district, now a famous apple country, and Prince Edward Island, which has a very fertile soil, there is little first-class farming land in the maritime provinces.

Grain fields have therefore largely given way to dairy pastures since railways reached the prairies of Manitoba.

The St. Lawrence Valley contains only a narrow strip of fertile alluvial soil near the river. Though situated in the latitude of southern France, the winters are cold on account of the prevailing west winds from the interior of the continent, and for the same reason the summers are long and hot. Maize and tobacco are staple crops, though less important than are oats, potatoes, and hay.

Southern Ontario, especially the peninsular portion, is the garden spot of Canada. It is a great fruit and dairy country, exporting quantities of apples and cheese. Canada is the greatest cheese-making and cheese-exporting country in the world. (Fig. 38.)

253. Farming in Western Canada. The prairie region west of Lake Winnipeg, extending north to the Peace River Valley, is estimated to contain four times as much prime wheat land as the United States. (Fig. 172.) Moreover, the soil is so fertile, when first won to the plow, that the average yield per acre is a fourth greater than is the yield in the United States. It is undeniably cold there in winter; but summer crops are not dependent on the winter temperature. Spring is said to be as early, and summer nearly as hot, at Dunvegan on the Peace River as at Winnipeg. Spring wheat is consequently a



Courtesy of C. N. Ry.

FIG. 172. *Miles of wheat in Canada, cut and ready for threshing. The lure that draws Americans to Canada.*

reliable crop at Dunvegan (latitude 56°), while potatoes ripen as far north as Fort Good Hope, almost on the Arctic Circle. It is thus apparent that Minneapolis is about in the center of the wheat-growing area of North America, measured from north to south. (Fig. 53.)

In recent years hundreds of thousands of American farmers have settled on these fertile prairie lands. This movement

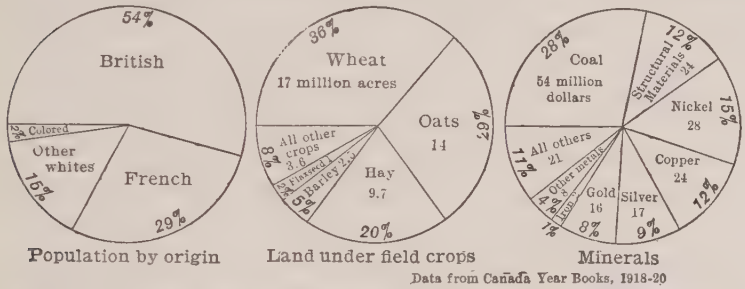


FIG. 173. *People, crops, and minerals of Canada. Totals: population, census of 1921, 8,769,516; land under field crops, five-year average, 47.8 million acres or 1.9% of total area; minerals, five-year average, 194 million dollars.*

is likely to grow in volume as the pressure for land becomes more severe in the United States.

The arid belt, principally south of the Canadian Pacific line, is given over to cattle ranches, though irrigation is rapidly being extended in the foothills near Calgary.

Where fairly level land can be found on the Pacific slope, grain and fruits, especially pears, reach perfection.

254. Mineral Resources of Canada. The mineral resources of Canada almost match those of the United States in extent and variety. (Fig. 173.)

Most of the metals exist in paying quantities. Gold, copper, and iron are found in three regions—the eastern provinces, the Lake Superior district, and the Cordilleran Highland. The largest output of gold is from the Klondike; of copper from the Rossland, B. C., mines; and of iron from Nova Scotia and the Superior district. The nickel deposits around Sudbury

are the most productive in the world; and important silver mines, producing also some cobalt,[1] have been opened in northern Ontario. Lead and the lesser metals are mined chiefly in British Columbia

Canada furnishes much of the mica used in the United States and also controls the world's market for asbestos, the principal mines being in Quebec.

Petroleum and natural gas are produced to a limited extent in peninsular Ontario near London. They also occur in vast quantities along the Mackenzie and Athabaska rivers.

Coal underlies three different districts: the eastern, in Nova Scotia: the central, on the eastern slope of the Rockies; and the Pacific, on the mainland and the islands about Nanaimo. The central field is by far the largest, though the least worked because without water transportation. It includes lignite in the plains, from the United States boundary to the Mackenzie River (where certain beds have been afire since 1788); bituminous coal at Lethbridge and Crowsnest Pass; and anthracite in the mountains around Banff. The farther from the mountains, the poorer is the coal. Anthracite occurs also in the Queen Charlotte Islands off the Pacific coast.

The Canadian coal fields (97,200 square miles) greatly exceed those of all Europe; but the St. Lawrence Valley, which is in other respects the best adapted for manufactures, is entirely destitute of coal.

255. Manufactures in Canada. Manufactures, stimulated by a high tariff and government bounties, drew to the cities the larger part of the increase of population from 1891 to 1911. Canada has plainly taken a leaf from the notebook of the United States and is striving for "autarchy"—the capacity of providing for itself—which Aristotle declared to be the necessary condition of political independence.

Some industries enjoy a decisive advantage from the cheapness of raw materials: for example, those employing lumber,

[1] Used mainly as a blue coloring material for porcelain, glass, etc.

grain, meat, or dairy products. Another factor of great importance is water power, in which Canada abounds. Pulp mills at the foot of the forested Laurentian Highland north of the St. Lawrence have incomparable advantages for paper making. The abundance of hemlock bark favors the tanning of leather and the manufacture of shoes at Quebec. The conjunction of coal, iron, and limestone has favored the iron industry at Sydney, N. S. There are also important iron works along the lakes, notably at Toronto, Hamilton, and Sault Ste. Marie, Ont. These use Superior iron and coal from Pennsylvania and Ohio.

Industries employing imported materials, such as cotton, wool, rubber, and sugar, are most prominent at Montreal. These owe their prosperity entirely to the higher prices paid by the consumers because of the protective tariff.

256. Transportation Systems of Canada. Canada is emphatically the land of magnificent water ways. The northern rivers—Yukon, Mackenzie, Saskatchewan—are, it is true, icebound much of the year; but they are nevertheless of value commercially, especially the Yukon. Still more important is the St. Lawrence system which, supplemented by seventy-five miles of fourteen-foot canals, carries good-sized vessels 2,700 miles inland. The Chambly Canal connects the St. Lawrence with Lake Champlain and the Hudson; while the Ottawa River with the Rideau Canal forms an alternative route to Lake Ontario.

In proportion to population, Canada has also a very large mileage of railways. (Tables 4 and 5.)

The Intercolonial Railway is a government venture, built to connect Montreal with tidewater without leaving Canadian territory. It was thus located according to political rather than economic considerations, and has seldom paid expenses.

The Canadian Pacific Railway (1885) extending from St. John to Vancouver virtually opened the "northwest passage" so long sought by mariners of all nations. Owing to the fact that as you go toward the pole each parallel of latitude forms

a smaller circle than the last, the Canadian transcontinental lines offer the shortest routes from Europe to China and Japan, and shorter to India than the route around Africa. Much oriental commerce now reaches London over these roads, and they would become of the greatest military importance to England should the Suez Canal be blocked by an enemy.

The Grand Trunk system extends from Portland, Me., through the central provinces to Chicago, passing the St. Clair River by tunnel. In 1914 it opened a line from Moncton, N. B., by way of Quebec, Winnipeg, and Edmonton to Prince Rupert on the Pacific. This route has easier grades and traverses less arid land than that of the Canadian Pacific. It also shortens by two days' sail the journey from Liverpool to Yokohama.

A third transcontinental line, the Canadian Northern, was completed in 1915 from Quebec to Port Mann. A branch is also under construction, from Winnipeg to Port Nelson on Hudson Bay, only 2,970 miles by sea from Liverpool, forming a new and shorter outlet for Canadian wheat. Hudson Bay is ice-free four months, including the month after harvest.

An all-British cable links Canada with Australia and New Zealand, "the newest England in the southern seas."

257. Commercial Centers of Canada. The commercial capital of Canada is Montreal. Though located nearly a thousand miles from the sea, it is about 300 miles nearer to Liverpool than is New York. Only the freezing of the St. Lawrence has hindered Montreal from becoming the metropolis of the New World.

As matters stand, the smaller lake boats carry wheat from Fort William and Port Arthur through the Welland Canal to Kingston, and in some cases direct to Montreal. The larger vessels, however, being unable to go through the Welland Canal, discharge their cargoes at Midland, Depot Harbor, and other ports[1] on Lake Huron, especially on Georgian Bay,

[1] Including Goderich on Lake Huron; Collingwood, Meaford, Port McNicoll, and Owen Sound on Georgian Bay.

whence grain goes east by rail. Perhaps a fifth of the American export wheat also takes these routes to the seaboard.

It is also estimated that thirty-two miles of canal would reopen an ancient natural channel from Georgian Bay to the Ottawa River, and so to the St. Lawrence at Montreal. This canal, effecting a great saving in distance and cost, would tend to sidetrack Buffalo and New York in favor of Montreal as the port of export for all northwestern products, American as well as Canadian.

Quebec, the old capital of French Canada, became a way station as soon as the St. Lawrence was deepened for ocean vessels (30 feet) to Montreal. Its interests are now manufacturing rather than commercial; but the constantly increasing size of ships and the bridging of the river near Quebec cannot fail to restore much of its commercial importance. Quebec will, in any event, become the summer port of the Grand Trunk Pacific and Canadian Northern systems.

Halifax, N. S., and St. John, N. B., have excellent, ice-free harbors; though the high tides at St. John, which serve to break the ice, also hinder the loading and unloading of vessels. Both cities are terminal points for the Intercolonial Railway, whose tracks are used by the Grand Trunk Pacific from Moncton to tidewater. Owing to the longer haul by land, these cities are at a disadvantage compared with ports lying nearer the interior like Montreal and New York; but St. John is tending to supplant Portland as the winter port of Canada (§149). Halifax is the great Canadian naval station on the Atlantic, as the harbor of Esquimalt is on the Pacific.

Toronto was originally the "Place of Meeting" where the portage began from Lake Ontario to Lake Huron. It has a fine harbor of the barrier type (§36), backed by the rich lands of the Ontario peninsula, and is the second city of Canada in population.

The Georgian Bay ports, located at the eastern end of the Great Lakes route, are the Canadian counterparts of Buffalo. Fort William and Port Arthur, twin ports standing where

the Canadian railways from the West first touch Lake Superior, correspond to Duluth-Superior. Winnipeg, located on the edge of the prairies, where the railways necessarily converge to pass around Lake Winnipeg (with which it is connected by river and canal), corresponds both in position and business push to Chicago. Edmonton, at the junction of navigable rivers and of railways, answers to Minneapolis and St. Paul. Finally, Vancouver takes the place of San Francisco and Prince Rupert of Puget Sound.

258. **The Commerce of Canada.** On the whole, the basis of Canadian prosperity is still agriculture, especially the rapid extension of wheat growing in the Northwest. The exports

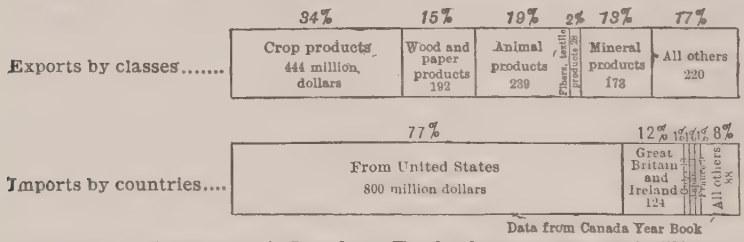


FIG. 174. *Commerce of Canada. Totals, five-year average (millions of dollars): export of home produce, 1,296 (42% to Great Britain, 36% to U. S.); imports, 1,047, chiefly manufactures.*

of Canada are therefore chiefly food and raw materials, while the imports are largely manufactured goods. (Fig. 174.)

In proportion to population, Canada is one of the best customers of the United States; though Canadian products have been heavily taxed in American markets. (Table 4.) Canada fronts the United States for over 3,000 miles. On both sides of this artificial line are found the same race and language. The resources of the two countries are largely complementary. Thus New England needs coal from Nova Scotia; middle Canada needs coal from Pennsylvania. Moreover, the lumber and ores of Canada are becoming indispensable in the United States, while Canada requires the products of our factories. Two countries were never more clearly dependent on each other for the highest prosperity.

The United States plainly missed its opportunity when it broke off the reciprocity treaty with Canada (1866). Canada now taxes American manufactures a third more than British goods; and Canadians are a unit in desiring either the present British connection or absolute independence.

259. Newfoundland. Newfoundland is the oldest British colony (1583). Having so far refused to join Canada, it is self-governing, subject only to Great Britain. The population is still small, though the island is as large (42,734 square miles) as Ohio. The eastern part of Labrador is also attached politically to Newfoundland.

The exclusive fishing rights claimed by the French on a large part of the shore, which long hindered the development of the colony, were given up in 1904; but France still holds St. Pierre and Miquelon, which serve as retreats for fishing vessels.

The surface of the island is broken, the coast line indented, and the climate raw and prolific in fogs on account of the Labrador Current, with its procession of icebergs. However, the climate is better on the west coast, where the valleys have some good farming land and heavy timber. The mineral resources are considerable, iron and copper ore being now mined. Fishing is still the leading industry, though agriculture is receiving increased attention. The exports are chiefly fish and ores; the imports, foodstuffs and manufactures.

The interests of Newfoundland incline to the United States, which offers a better natural market for fish than Canada; but a continued refusal to admit fish untaxed must eventually drive Newfoundland into the arms of Canada.

A railroad crosses the island, connecting by steamer with Cape Breton. St. Johns, the capital, only 1,650 miles from Ireland, is thus in effect the eastern terminus of the railroad system of North America.

260. The American Mediterranean. The great inclosed basins of the Caribbean and the Gulf of Mexico, forming the American Mediterranean (Fig. 194), are exceeded in their extent and the richness of their bordering lands only by the Mediterranean Sea of the Old World and by the Sea of Japan.[1]

261. Physical Features of Middle America. Middle America consists of Mexico and Central America, which are very much alike in topography, climate, and population. Mexico (Fig. 182) consists in the main of a lofty plateau (6,000-8,000 feet) inclosed between loftier mountains and traversed from east to west, in the latitude of Vera Cruz, by a belt of towering volcanoes. (Fig. 175.) The range traversing Lower California also reappears on the mainland northwest of Manzanillo.

East of the Isthmus of Tehuantepec, where the mountain system of North America really ends and a strait formerly connected the oceans, the general trend of the mountains both on the mainland and the Greater Antilles is east and west. Here, too, there are lofty plateaus, but separated by deep depressions in Honduras, Nicaragua, and Panama, where other straits formerly connected the oceans.

The climate is governed chiefly by elevation and exposure to the prevailing northeast trade wind. The climatic zones are thus vertically disposed, rising from tropical lowlands through all gradations of climate to peaks clad in perpetual snow. (Fig. 176.) Owing to the prevalence of the northeast trade wind and the nearer approach of the equatorial belt of calms and rains in summer, the rainfall is greatest, and is in fact excessive, on the Caribbean slope, especially in summer; it is least on the Pacific slope, and in winter. It also increases gradually toward the south. Yucatan and the plateau of

[1]Shaler, *Sea and Land*, ("The Formation and Preservation of Harbors," ch. 6).

northern Mexico are, however, arid, like other tracts in the trade-wind zones which lack mountains to condense moisture.

By reason of cooler climate, the lofty plateau containing the City of Mexico has been the seat of power, alike under the Aztecs and the Spaniards. In Central America most of the population and agriculture are confined to the similar lofty plateaus of Guatemala and Costa Rica, together with the narrow volcanic zone along the Pacific, which are relatively cool and somewhat sheltered from the trade wind. (Fig. 78.)

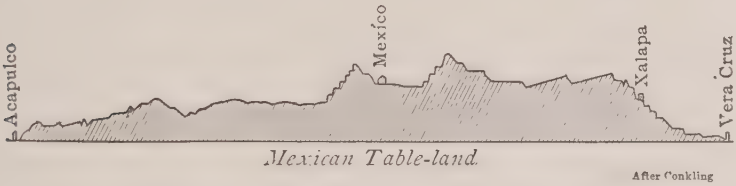


FIG. 175. *Profile view of Mexico.*

262. The Inhabitants of Middle America. The Spaniards conquered (1521) but never effectively colonized Mexico or Central America. They merely reduced the natives to serfdom, imposing themselves as a ruling class. They were, moreover, for the most part adventurers, who came without families and married Indian women. The Indian element thus retains an overwhelming preponderance, even in Mexico; while in Central America, except on the lofty plateau of Costa Rica, practically the entire population consists of Indians and half-breeds of various degrees, together with some negroes along the coasts. (Fig. 178.)

This predominance of races fresh from barbarism doubtless goes far to explain the turbulence and corruption of most of these states. Such conditions have severely limited industry and commerce. Volcanoes and earthquakes are less destructive than perpetual revolution.

In Mexico a despot arose strong and enlightened enough to enforce peace and favor commerce; but after Diaz came indeed the deluge—a series of violent and destructive revolutions.

263. Products of the Soil in Middle America. In point of size, Mexico about equals the southern section of the United States, while Central America equals the Atlantic states north of the Potomac. The products depend, however, less on the latitude than on the elevation and rainfall. (Figs. 78 and 176.)

The first agricultural industry established by the Spaniards was cattle raising. This is still of much importance. The Mexican plateau north of 20° is, indeed, a natural range country; and so are the well-grassed plateaus in Central America wherever shielded from the trade wind. Honduras and Nicaragua are largely occupied by cattle ranches, while the higher plateaus in Mexico and Guatemala pasture sheep. The quality of stock is everywhere poor, owing to lack of care, for this is the land of *mañana* —to-morrow.

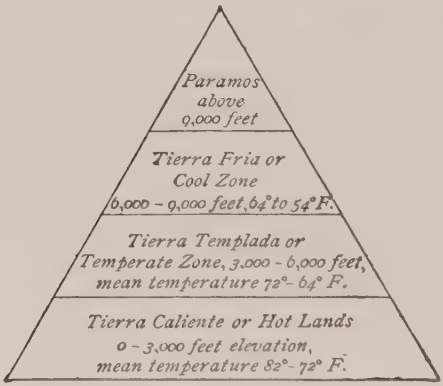


FIG. 176. *Vertical zones of climate in tropical America. The elevations given are merely approximate, as usage varies in different localities.*

The low-lying, hot country (*tierra caliente*) is fever-haunted; but the soil is very rich and vegetation never ceases growth. Here are found, especially along the Caribbean, dense forests producing mahogany, rosewood, cedar, logwood and fustic (both yielding dyes), rubber, chicle (used in chewing gum), and in Salvador a medicinal substance called "balsam of Peru." The cultivated products which enter commerce are chiefly sugar and cocoa along the Pacific, bananas and cocoanuts along the Caribbean, indigo in Salvador, and vanilla around Vera Cruz.

The zone of medium elevation and temperature (*tierra templada*) will raise sugar cane and wheat side by side. Its

distinctive crop, however, is coffee, grown chiefly in southern Mexico and in Central America along the Pacific. Tobacco and cotton are of some importance, especially in Mexico. Most of the Mexican cotton comes from the irrigated lake (*Laguna*) district near Lerdo. The leading food crops of this zone, and indeed of Middle America as a whole, are corn and red beans (*frijoles*). Chick-peas (*garbanzos*) are an article of export to Spain, especially from Mexico.

The cool zone (*tierra fria*) consists of lofty plateaus which are in effect pieces of the Temperate zone set down in the midst

FIG. 177. *Cutting agave leaves for sisal fiber in Yucatan.*

of the Tropics. In this zone most of the temperate crops and fruits are grown, but mainly for local consumption. (Fig. 176.)

In dry districts, at various elevations, several species of agaves (Fig. 177) or century plants are very extensively cultivated, one species yielding sisal fiber, another Tampico or ixtle fiber, and a third the national drink of Mexico.[1] The chief center of sisal culture is Yucatan, where the plant is

[1]Called pulque and consisting of the fermented juice of the *Agave Americana*. A stronger liquor, mescal, is made by distillation of agave roots.

indigenous. Now that a gin has been invented for extracting the fiber, sisal has become a great crop where little else will grow. In arid parts of the Mexican plateau, especially around Torreon, is also found a shrub (*guayule*) which has become important as a source of rubber.

Mexican and Central American coffee, being far superior to Brazilian, is marketed chiefly in Europe. This fact is unfavorable to the development of import trade from the United States.

264. Other Natural Resources of Middle America. Valuable pearl fisheries exist in the Gulf of California and Nicoya Bay, yielding pearls and pearl shells for export.

It was the wealth of Mexico in precious metals that attracted Cortés and his soldiers of fortune. Under Diaz much American capital was invested in Mexican mines and railways.

Silver, zinc, and lead are abundant on the Mexican plateau[1]; and there has been a phenomenal development of copper mining in the Cananea district and in Lower California. Mexico stands next to the United States in the production of silver, and ranks high in copper. (Fig. 138.) Iron is also abundant, notably in the famous "iron mountain" near Durango; though the high cost of fuel has hitherto restricted its use. Gold occurs in paying quantities on the Pacific slope, a continuation of the California gold fields.

In Central America, some gold "diggings" have been opened on the Caribbean slope in Nicaragua, and veins of silver in Honduras. But the rich mineral resources of Central America are largely undeveloped, owing to lack of transportation facilities and to repeated revolutions.

Of the non-metallic substances, petroleum, coal, salt, sulphur, and precious stones (opals and onyx) are worked. The development of petroleum has been rapid, and Mexico now ranks second to the United States in furnishing the world's supply. The vast oil fields stretch along the Gulf coast, the richest area being the Tuxpam zone near Vera Cruz. Although coal deposits are plentiful, Mexico still imports much coal.

[1]Around Guanajuato, Zacatecas, San Luis Potosi, and Chihuahua.

265. Manufactures of Mexico and Central America. The Aztecs and Mayas, the chief Indian tribes, were skillful artisans; and to them, rather than to the conquering Spaniards, is due the characteristic handiwork of Mexico and Central America. Examples are the Mexican lace and drawn work, especially at Aguascalientes, the carved and inlaid woods, the feather goods, pottery, jewelry, waxwork, blankets, cloaks (*serapes*), and Yucatan hammocks, which have made Mexico famous. Leather goods, on the other hand, were introduced by the Spaniards, though a native tanning agent (*cascalote* pods) is chiefly employed. The pottery industry centers at Guadalajara and leather working at Leon.

Manufacturing by power machinery has been hindered by the scarcity and high price of fuel; but the waterfalls at the edge of the Mexican plateau are now furnishing power. There are upward of 150 textile mills, using domestic cotton and some from the United States. The leading textile center is Puebla.[1] Modern blast furnaces, burning coke, have been established at Monterrey, near the Sabinas coal field. Large refineries are located near the oil fields, especially at Tampico.

266. Transportation in Middle America. Toward the Gulf and Caribbean, the land descends by a series of broad terraces, ending in a flat coast devoid of deep natural harbors. Vera Cruz, partially sheltered by small islands, and the river ports, Tampico and Puerto Mexico (Coatzacoalcos), all required costly works to render them safe and accessible to large vessels. Vera Cruz has long been the chief commercial port, being the nearest outlet of the fertile plateau around the capital; but Tampico has a better harbor and climate, and easier grades up to the plateau. It has also connection through a canal and lagoon with Tuxpam, and since the development of the oil fields its commerce exceeds that of Vera Cruz. Puerto Mexico, being the Gulf terminus of an interoceanic railway only 192 miles long, with a summit level of only 924 feet, had a great

[1]Both cotton and wool are woven at Puebla; wool also at Aguascalientes.

transit trade before the opening of the Panama Canal. This route may continue to hold the mail, passenger, and perishable goods traffic, since there is a saving of some four days over the Panama route.

In Central America north of Panama, the chief gateways of trade on the Caribbean are Puerto Barrios in Guatemala, and Limon in Costa Rica,[1] each the terminus of a railway line which brings the Pacific within a few days of New Orleans. (Fig. 194.) These railways, drawing trade toward the Caribbean, are favorable to the commerce of the United States. They are, in fact, largely controlled by Americans interested in the banana trade.

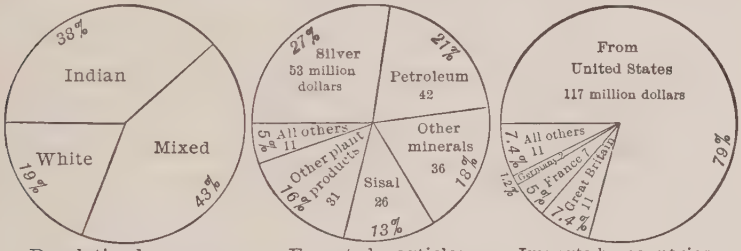
On the Pacific coast of Mexico there are some good harbors, but mostly backed by precipitous mountains and difficult of access from the Mexican plateau. (Fig. 175.) This is the case at Acapulco, the best natural harbor on that coast. The principal commercial ports are Guaymas, reached by the Southern Pacific; Manzanillo, now connected by rail with Tampico; and Salina Cruz, on an artificial harbor at the terminus of the Tehuantepec National Railway. (Fig. 182.) A trunk-line railway along the Pacific coast has been built from Guaymas through Mazatlan and Guadalajara; and a branch of the Tehuantepec Railway extends along the coast to the Guatemalan frontier. Several other ports seem assured of through railways, especially Topolobampo, the port of the partially completed Kansas City, Mexico & Orient system. All these railway extensions are due chiefly to the Panama Canal, which has for the first time effectively opened the eastern Pacific to commerce.[2]

[1]The Limon line, 170 miles long, has a summit level of 5,040 feet; and the Barrios line, 271 miles in length, also has a high summit level.

[2]The "great circle" or shortest route from Panama to Hawaii hugs the shore almost to San Francisco. This fact will necessarily render the Pacific ports of Mexico commercially important. It also gives new value to the United States coaling station near La Paz (acquired 1868); though naval authorities insist that Bahia de la Magdalena is far preferable and in fact indispensable for naval purposes. (See Rear Admiral Bradford, *Forum*, Feb., 1899.)

In Central America, owing to the location of agriculture and population, the Pacific ports handle a relatively large volume of trade. They are, however, mostly roadsteads exposed to the open sea.[1]

Internal transportation is extremely difficult. There are no navigable rivers of importance, and few roads except mule paths. Many a promising mining enterprise has failed because machinery could not reach the mines. Everything, therefore, depends upon railroads—the "iron rivers" of this region. The Mexican government, in order not to be at the mercy of



U. S. Dept. of Statistics, Archives, and Records, Imports, and, Exports, Dec. 1920

FIG. 178. *Races and commerce of Mexico. Totals: population, in 1910, 15,160,369; commerce, two-year average (millions of dollars): exports, 199 (94% to U. S.); imports, 148, chiefly coal, foodstuffs, and manufactures.*

private interests, consequently bought enough stock to control the principal railways reaching nearly all parts of the Republic[2] and proceeded to operate them as a single system.

267. Commerce of Middle America. The exports of Mexico and Central America are for the most part metals, oil, hides, and crude products of the forest and plantation; while the imports are foods and manufactured goods.

In Mexico, because of proximity, extensive American

[1]So all in Guatemala, and all in Salvador except El Triunfo and La Union. The best are Amapala on the Gulf of Fonseca, Corinto, and Puntarenas.

[2]This government "merger," called the National Railways of Mexico, includes, besides the Tehuantepec, which was built by the government, the Vera Cruz and Pacific, the Central, National, International, and Interoceanic lines.

investments, and the several trunk lines of railways connecting with American roads, the United States has the largest trade. (Fig. 178.) Europe, however, still supplies many lines of manufactures in Mexico, and has almost a monopoly in parts of Central America. The reason no doubt is, in large part, that Spaniards handle the trade of Mexico; and that the British handle the trade of Central America. The British also own many of the plantations, aside from the banana orchards; and landed property is everywhere the true basis of power.

268. The West Indies. The West Indies consist of several mountain ranges, partially submerged, which if revealed in their whole majestic height would equal the Himálayas. The outlying Bermudas and Bahamas are, however, of coral formation. The climate, except in these outlying groups, is thoroughly tropical, though all the larger islands contain temperate uplands, especially Haiti, which by a strange freak of fortune has become the black man's second home.

Owing to the trade wind, nearly all the towns in the Lesser Antilles lie on the sheltered western shore.

269. The Inhabitants of the West Indies. Most of the natives on the islands speedily perished under the yoke of slavery. The ground was thus apparently cleared for a white laboring population. The cultivation of sugar cane, however, fastened African slavery upon the West Indies, as cotton did upon the southern part of the United States; and in many of the islands, especially the French, the whites have merged in a common mulatto population.[1]

The West Indies are consequently, with the exception of Cuba and Porto Rico, and the little Dutch island of Saba,[2] as overwhelmingly African as Central America is Indian in population.

[1]Doubtless because in the West Indies, as in Mexico, a person having any white blood whatsoever passes for white, while the color line is drawn between the mixed-bloods and the full-blooded negroes or Indians.

[2]Inhabited by English-speaking Dutch boat builders and fishermen, who seem to thrive despite the tropical climate.

270. The British West Indies. For more than three centuries the West Indies have been "the grand arena of the war of nations." Every island consequently has a history as varied as a separate country. Being thus the prize of naval victory, most of them have been acquired by England through her overmastering sea power. The British possessions include the Bermudas, Bahamas, Jamaica with its dependencies, and the bulk of the Lesser Antilles extending like an arch from Porto Rico to Trinidad. (Table 4.)

For nearly a century, however, the West Indies have been undergoing economic decay. Emancipation left the estates without efficient laborers; for the freed negroes generally "squatted" on vacant lands, cultivating little patches of yams and sweet potatoes, and refusing to work regularly on the plantations. Then the competition of European beet sugar ruined the cane-sugar industry, except in Cuba; and even there it produced the insurrection which led to the Spanish-American War. Much land once worth several hundred dollars an acre has consequently reverted to jungle.

271. The Bermudas and Bahamas. The Bermudas are commercially dependent on New York, exporting early potatoes and onions, besides lily bulbs. Their importance to England is strategic rather than commercial, consisting in their position near the American coast and their harbor, "difficult to enter, secure when entered." The Bermudas are consequently a coaling and naval station, heavily fortified, forming one of England's principal ocean strongholds.

The Bahamas, being of coral formation, are low and therefore rather dry. The leading exports are sponges, salt, and ambergris[1] from the sea, sisal and pineapples from the soil. Like the Bermudas, the Bahamas are a favorite winter resort for Americans. The harbor of Nassau, though shallow, has an admirable location on the Strait of Florida and very near the mainland.

[1]A peculiar substance from the sperm whale which commands a high price as an ingredient in — perfumes!

272. The Lesser Antilles and Jamaica. In the West Indies proper, there are also some low islands, such as Barbuda, which, lacking mountains to serve as "rain condensers," produce chiefly salt and guano, besides scanty pasturage.

On most of the West Indies the planters are still trying to raise sugar cane; but only the island of Barbados makes it pay, through having a dense population and therefore abundant labor, and Trinidad, through the use of Hindu coolies. The most promising crops for small islands and small farmers, since they require neither expensive mills (for which adequate producing acreage is not available) like sugar, nor rapid transportation like fruit, are sea-island cotton on the plains, cocoa on the lower slopes (below 1,500 feet), and coffee on the mountains. Cotton has accordingly become important in St. Vincent, Antigua, and most of the smaller islands; as have cocoa in Trinidad and Grenada; coffee in Jamaica, which ranks next to Haiti in this crop; limes for the preparation of lime juice in Dominica and Montserrat; nutmegs in Grenada; and bananas, oranges, and coconuts in Jamaica. In addition to fruit and coffee, Jamaica exports pimento or allspice (native to that island), ginger, logwood, and annatto—the latter only too familiar in the beautiful golden tint imparted by its use to much creamery butter. The pitch lake of Trinidad furnishes much of the asphalt used in American pavements, and associated with the pitch are considerable oil deposits.

273. Principal Ports of the British West Indies. The British islands, like the French, have excellent roads and several short railways. They also contain a number of fine harbors. Barbados, though not well sheltered, is by reason of its location the headquarters of the British Royal Mail steamship line, which makes the circuit of the West Indies. Port of Spain, Trinidad, is likewise by reason of its location the transhipment port of the Orinoco Valley. Kingston Harbor, Jamaica, is situated in the very center of the American Mediterranean, on the direct route from New York to the Panama Canal. Castries Harbor, St. Lucia, an ancient crater

with narrow entrance between towering rocks, is another fortified outpost of the British Empire.

274. **The Island of Haiti.** The island of Haiti, after Cuba the largest and most fertile in the West Indies, is divided between a French-speaking negro state (Haiti) in the west end, and a Spanish-speaking mulatto state, the Dominican Republic (Santo Domingo), in the east. Both were so disorderly and so deeply in debt that only the Monroe Doctrine has hitherto prevented the occupation of the island by some European power. The two republics have become practically protectorates of the United States, their customs revenues being administered by American officials, as a measure of protection against foreign creditors and domestic revolutionists.

The forested mountains contain all the usual cabinet and dye woods (§263), also ebony and satinwood. The forests are the largest natural resource of the island. Haiti has in addition the best pasturage in the West Indies; though the export of hides only about equals the export of beeswax. Many kinds of mineral deposits are reported, but their commercial value remains to be determined.

The principal export crops are coffee in the west, cocoa in the east, and sugar in the south. Others are tobacco in the Puerto Plato district, and cotton from a tree growing wild. Banana plantations have been set out by Americans. The trade of the country is mostly handled by the United States.

Aside from several short railways, the principal means of land transportation is the patient donkey. There are, however, many good harbors. Bahia de Samana and Mole St. Nicolas, which the United States once sought to acquire for naval purposes,[1] are deep, safe, and defensible, the one facing the Mona and the other the Windward Passage. Other natural harbors are found at Puerto Plata and Cap Haitien on the north, and Port au Prince on the west, coast. These three are the principal centers of commerce.

[1] Under Grant and Hayes, respectively. In 1869 the Dominican Republic voted in favor of annexation to the United States, but the treaty failed in the United States Senate.

275. The French West Indies. The French West Indies consist of Guadéloupe, Martinique, and their dependencies, including the outlying islands of St. Barthélemy and half the island of St. Martin. It is a fact worthy of note that all the islands—American, Dutch, and French—between Culebra and Guadéloupe are English-speaking, while all the islands from Guadéloupe south are French-speaking, except Barbados. The leading exports of the islands are sugar, coffee, and cocoa.

The French islands have fared somewhat better commercially than the English, as their products are protected in the French market. Yet they have suffered like all the others from the division of the West Indies among several European nations, which hinders inter-island trade, and from the lack of free trade with the United States, their natural market.

The French steamship line and the French navy make their West Indian headquarters at Fort de France, on a broad but shallow bay. There is also a fortified naval and coaling station inclosed by small islands near Gaudéloupe.

276. The American Virgin Islands. The American Virgin Islands consist of three islands near Porto Rico. They were acquired by the United States in 1917 by purchase from Denmark. Ste. Croix, the largest of the islands, produces sugar, while St. Thomas and St. John are interested in livestock products, growing also bay trees for the preparation of bay rum. St. Thomas is "the keystone of the Antillean arch." Lying on the Anegada Passage, the most direct route from Europe, it is the cable, coaling, and commercial center of the eastern Caribbean. Moreover, its harbor is secure.

The United States tried in 1867 and 1902 to buy these islands, but negotiations failed. After the outbreak of the European War (1914) and the entrance of the United States into it (1917) a third attempt was successful (1917).[1]

277. The Dutch West Indies. The Dutch West Indies include two widely-separated groups, both English-speaking.

[1] The first treaty, negotiated by Seward, was defeated in Congress (1867); the second failed of ratification by Denmark (1902).

One consists of St. Eustatius (which served as a depot of supplies for the Americans during the Revolution), Saba, and half of St. Martin—all near Porto Rico; the other includes Curaçao and two adjacent islands off the Venezuelan coast. The latter group produces chiefly salt, phosphates, and goatskins, besides a limited amount of gold.

"Spotless Curaçao," the cleanest place in the West Indies, is remarkably healthful as it lies outside the belt of heavy

FIG. 179. *Harbor of Curaçao. The vessel has just come through the narrow entrance at the right, while beyond is a fort crowning the hill.*

coastal rains, and it has a splendid landlocked harbor, with deep water close to the shore. (Fig. 179.) This is the great center of transit trade with the ports of South America on the Caribbean. Moreover, naval authorities have pointed out that it commands all routes to Panama passing east or south of Porto Rico.[1]

Now that the Panama Canal is open, all the West Indies, and more especially the islands of the two Dutch groups, lie no longer on a back eddy but on a main current of the world's commerce.

[1] See Mahan, *Interest of America in Sea Power*, and Rear Admiral Bradford, in the *Forum*, Feb., 1899.

XIX—TROPICAL SOUTH AMERICA

278. South America as a Whole. On a globe South America appears like North America shorn of its peninsulas, islands, and gulfs. It has, like North America, three mountain sytems, the Guiana Mountains resembling the Laurentian Highland; and two great rivers, the Amazon corresponding in position to the St. Lawrence, and the La Plata, to the Mississippi. (Fig. 181.)

The interior plain in South America is, however. lower than in North America, while the Andes are both higher and steeper than the Rockies. South America, has, in fact. a larger proportion (42 per cent) of lowlands under 600 feet elevation, and a larger proportion (6 per cent) of highlands above 10,000 feet, than any other continent.

In consequence of the vast extent of the lowlands, the Atlantic rivers are generally navigable for long distances. In this respect South America is more favored than any other continent. On the other hand, the great elevation and the abrupt slopes of the Andes render them an almost insuperable obstacle to commerce by land, while the practically unbroken coast line, especially on the Pacific Ocean, is not favorable to commerce by sea.

279. The Climate of Tropical South America. In respect to size South America is but little inferior to North America. Owing to its size and great differences in latitude and elevation, South America is a "country of all climates."

The equatorial belt of calms and heavy rains crosses South America. On the eastern slope of the Andes near the equator it is said to "rain thirteen months in the year." On both sides of the doldrums, the subequatorial zones are well developed, being marked by belts of grasslands wherever the surface is level (llanos, campos). The trade winds, however, encountering highlands as they move inland, are rain-bearing in place

FIG. 180. *Dominion of Canada and Newfoundland.*

Longitude West from Greenwich
80°
60°
40°
0°
JAMAICA
HAITI
PORTO RICO
CARIBBEAN SEA
MARTINIQUE
BARBADOS (BR.)
CURAÇAO (DUTCH)
Puerto Cabello
La Guaira
Barcelona
Guanta
Port of Spain
TRINIDAD (BR.)
CAPACAS
Barquisimeto
Santa Marta
Pto. Colombia
Barranquilla
Cartagena
Calamar
Colon
PANAMA CANAL
PANAMA
Gulf of Panama
Puerto Berrio
Medellin
Honda
Ambalema
Jirabol
BOGOTA
Cabuyaro
Buenaventura
Mt. Pasto
COLOMBIA
VENEZUELA
LLANOS OF THE ORINOCO
Ciudad Bolivar
GEORGETOWN
PARAMARIBO
CAYENNE
GUIANA HIGHLANDS
GUIANA
(BRITISH) (DUTCH) (FRENCH)
13000 ft.
6500 ft.
Mouths of the Amazon River
EQUATOR
GALÁPAGOS Is.
Latitude North
QUITO
Mt. Chimborazo
Guayaquil
Gulf of Guayaquil
ECUADOR
Cape Blanco
Pta. Parina
Payta
Piura
Pongo de Manseriche
Iquitos
SELVAS
Rio Negro
Manaos
Amazon R.
Belem (Pará)
São Luis (Maranhão)
Fortaleza (Ceará)
FERNANDO NORONHA I.
Cape São Roque
Recife (Pernambuco)
Trujillo
Cerro de Pasco
Oroya
Callao
LIMA
Pisco
Cuzco
Puno
L. Titicaca
Mt. Sorata (Illampu)
Illimani
LA PAZ
PLATEAU
Mollendo
Cochabamba
Oruro
Falls of the Madeira
Madeira River
Rio Roosevelt
Beni R.
BRAZIL
Tocantins River
São Francisco
São Salvador (Bahia)
Cuyabá
CAMPOS
Diamantina
PACIFIC OCEAN

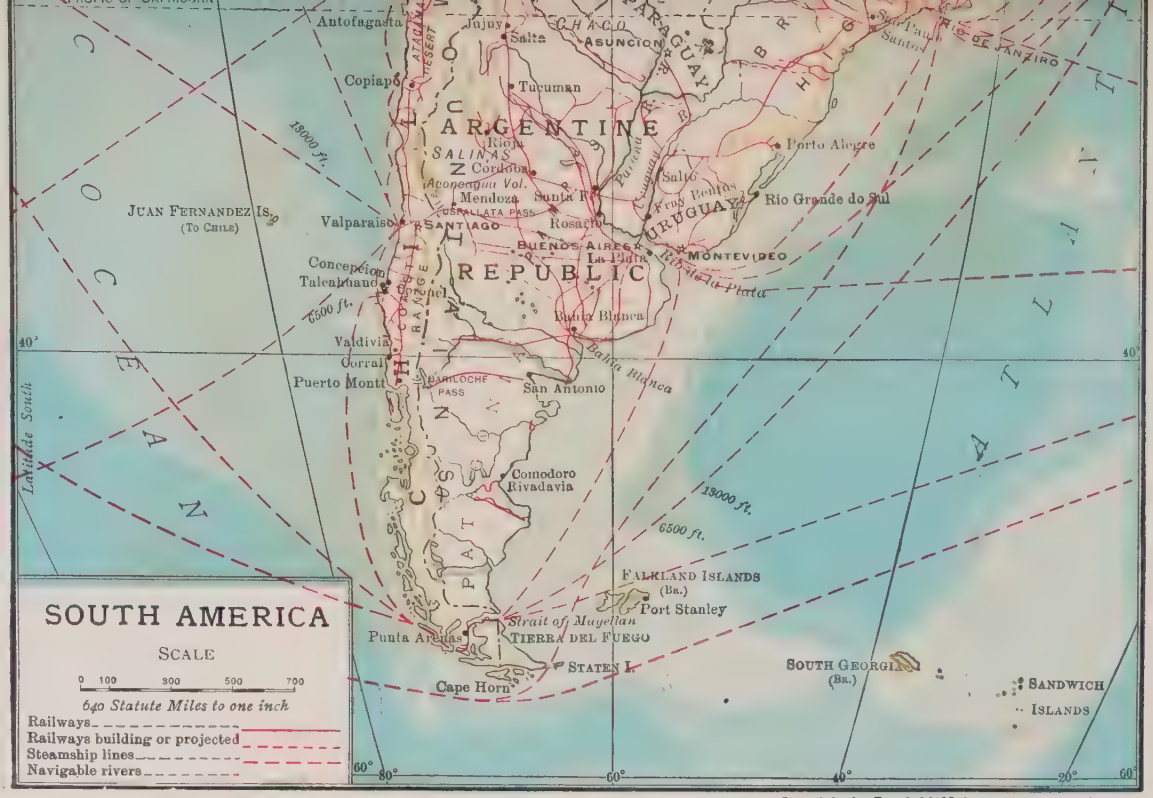


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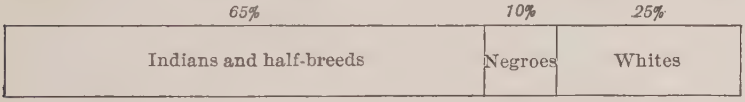
FIG. 181. *South America.*

FIG. 182. *Mexico.*

of drying winds, as far west as the crest of the Andes. The only extensive trade-wind desert in South America is thus west of the Andes (5°–30°) where the wind descends from the mountains. (§44 and §51.)

Being broadest near the equator, four-fifths of South America lies within the Tropics.

In the Andean region, however, there are numerous mountain-girt plateaus, like the one in Mexico, which are temperate or even frigid because of elevation.[1] They are also very fertile, being usually floored with waste from the neighboring mountains. These plateaus were the seats of the Inca and other native civilizations. There, too, the Spaniards, a mountain-loving people, largely fixed their abodes; for civilization seems to climb the mountain sides as you go toward the equator. For centuries, however, these plateaus were, and in large part they still are, inaccessible except on mule-back. This fact



Data from Chisholm, Handbook

FIG. 183. *Population of South America by races.*

has rendered them a "land of yesterday," where a crooked stick still serves for a plow, and commerce in the modern sense is impossible.

280. The Inhabitants of South America. People as well as crops vary with the climate. Nowhere is this fact more strikingly shown than in South America. Nebraska differs little more from Nicaragua in all that pertains to energy, industry, and commerce, than Chile differs from Colombia, or Argentina from tropical Brazil.

[1]The average elevations of the chief Andean plateaus are: Carácas, 3,000 feet; Bogotá, 8,700; Quito, 9,500; Cuzco, 11,500; Titicaca or La Paz, 12,500; Cochabamba, 8,000. The mountains inclosing these plateaus consist of two main chains from the southern Tropic to the mountain knot of Pasto in latitude 1° N.; and three chains thence to Bogotá, where the eastern chain subdivides, and sends off the Venezuelan coast range to the eastward, making four in all.

To the influence of climate is added the influence of race. (Fig. 183.) Wherever the Indians were sufficiently accustomed to labor to make valuable slaves, as they were on the Andean plateaus, the Spaniards became merely a ruling class which rapidly blended with the subject race, as in Mexico. The Andean countries are, therefore, almost solidly Indian in population. Along the Caribbean and in tropical Brazil, again, where the Indians were too weak or intractable to be useful as slaves, negroes were imported as in the West Indies; and the people are now an indescribable mixture of red, white, and black, with the black tending to predominate.

Throughout temperate South America, on the other hand, the population is almost exclusively white. The pampas Indians, being hunters, were neither numerous nor useful as slaves; and there was no industry there in colonial days calling for negro labor. Argentina, Uruguay, and southern Brazil thus have even a smaller proportion of colored inhabitants than New England.

In point of language, all South America is Spanish except Brazil which is Portuguese, and the three Guianas which use the languages of the home countries. In addition, educated people in all parts of America south of the United States almost universally understand and speak French, the language of the greatest Latin nation.

281. Grasslands of Tropical South America. The llanos and campos are natural cattle ranges. The Orinoco region, having river transportation, is already a serious factor in commerce. On the Brazilian Plateau, on the western or dry side of the Atlantic mountains, stock raising is likewise the dominant industry south of 12° or even 10° S. latitude, especially in the great state of Rio Grande do Sul.

The Andean plateaus, which reach 400 miles in width, and in many places rise above the timber line, are adapted to sheep, llamas, and alpacas. Some hides and wool from these animals, and from the wild vicuñas and guanacos, are sent to the coast for export.

282. Forest Products of Tropical South America. With the exception of these grasslands, and the Pacific coast between latitude 5° and 35° S., which is arid, practically all of tropical South America bears heavy forests. In many places the jungles are so dense that the rivers are the only possible roads.

The most valuable forest products are rubber, balata, and ivory nuts. Ivory nuts have a very hard, white meat which is often substituted for animal ivory.

There are also, in addition to the usual cabinet and dyewoods (§263), several other valuable forest products in this region. Piassava, a kind of rush, is employed for brooms. The wax of the carnauba palm serves for candles. Brazil nuts, known to commerce as "Pará chestnuts," are extensively exported to Europe and North America. Tonka beans are employed in perfumes. Brazil wood yields a brilliant red dye. Divi-divi pods are an effective tanning agent. Finally, there are innumerable medicinal substances, including sarsaparilla, several varieties of balsam,[1] cinchona, and cocoa.

Courtesy of Dept. of Agriculture

FIG. 184. *Tapping a rubber tree.*

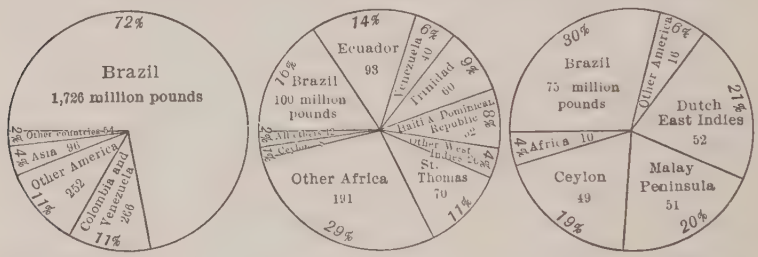
Cinchona or Peruvian bark yields quinine, a drug invaluable for malaria; and the coca tree yields cocaine, used in surgery. Both of these trees are native to the Andes, cinchona on the

[1]Chiefly balsam copaiba and tolu.

western and coca on the eastern slopes, where plantations have been established to supplement the wild supply. (Fig. 218.)

283. The Rubber Industry in South America. Rubber, which has become indispensable in almost innumerable manufactures (§107), is one of the greatest commercial staples of tropical South America, especially of the Amazon Basin, where it is still chiefly obtained from wild trees. (Figs 184 and 185.) It occurs in the sap, from which it is separated by coagulation.

The best grade, known as Pará from the place of export, comes from several species of trees (*Heveas*) growing where the annual rainfall is 100 inches and upward well distributed



U. S. Year Book of Agriculture; Int. Inst. Agri.; U. S. Commerce Reports

FIG. 185. *Staple tropical exports of South America. Totals, five-year averages (millions of pounds): coffee exports, 2,394; cocoa crops, 652; rubber exports, 253.*

throughout the year, and the annual temperature is about 80°. These flourish on lowlands and slopes up to 2,000 feet elevation.[1] Maniçoba rubber, also called Ceará from a state in Brazil, comes from a tree related to the cassava plant. This tree is at home on stony or sandy soils where the rainfall is moderate. A third grade of rubber, Mangabeira, from a tree accustomed to a distinct dry season, reaches the market mainly through the port of Pernambuco. Finally, an inferior rubber, Caucho, is derived from still a different tree, native to Central America and the western coast of South America as far south as Peru. It is a lowland but not a swamp tree, and like the others named, cannot stand temperatures below 60° F.

[1]Freeman and Chandler, *The World's Commercial Products*, p. 282.

Balata, obtained from a tree native to the Caribbean slope, is a substitute for gutta-percha.

284. The Crops of Tropical South America. The staple food crops on the lowlands are rice and manioc or cassava, a root crop which takes the place of potatoes in this part of the Tropics. Both are also exported to some extent; the manioc chiefly in the form of mandioca (manioc flour) or tapioca. At medium elevations the food crops are, as in Mexico, corn and beans; while on the cold Andean plateaus, wheat matures up to 10,000 feet, barley, quinua (a cereal peculiar to the Andes), and potatoes to 13,000 feet. Some estates in Bolivia on the

FIG. 186. *Picking coffee near São Paulo.*

mountain sides produce the crops of all three zones; but in general the lowlands can obtain wheat from abroad more cheaply than it can be carried down the mountains on mule-back.

The most important export crop is coffee (Fig. 186), which is grown on the middle slopes (1,000 to 1,500 feet elevation) around Rio de Janeiro and Santos, and again at higher elevations (up to 6,000 feet) from Caracas to Bogotá. Next in rank is cocoa, grown at lower elevations (under 1,500 feet) in Ecuador, in Brazil around Bahia, and also in the Caracas district. Brazil furnishes the largest portion though not the best grade of the world's coffee. Ecuador, where cocoa is indigenous, has the largest production of cocoa. (Fig. 187.)

Under the name of "valorization" of coffee, Brazil has established a government coffee trust, the intent and the effect being to compel foreign nations (that is, chiefly the United States, the principal market for low-grade coffees), to pay an artificial monopoly price for coffee. This emphasizes the desirability of developing the coffee industry in the islands belonging to the United States to prevent such extortion.

FIG. 187. *Gathering cocoa pods in Ecuador.*

Other crops of considerable value are cotton and sugar, exported from Pernambuco and also from the irrigated coast valleys of Peru in the same latitude. "Peruvian rough" cotton from the Piura Valley is especially adapted for mixing with wool. Tobacco is exported chiefly from the Bahia district in Brazil, the crop elsewhere serving local use. The bulk of the

Brazilian tobacco crop is grown in the great interior valley of the São Francisco. Large quantities of bananas and coconuts reach the United States from Colombia, and an American company has acquired extensive holdings of banana lands around Santa Marta Cesar.

285. **Mineral Resources of Tropical South America.** All three mountain systems abound in metals. The silver mines of Potosi and Cerro de Pasco for centuries produced fabulous sums; yet the surface has hardly been scratched, and the old dump piles still carry more silver than many paying ores in the United States. Tin is largely mined in the Oruro district of Bolivia (Fig. 219); copper at Cerro de Pasco in Peru, where silver is now a by-product; and manganese in Brazil. (Fig. 223.) Important gold fields have also been opened in Guiana, where tradition placed El Dorado, the Gilded Man.

Diamonds came chiefly from Brazil before the discovery of the South African deposits, and Brazil is still an important source of colored stones, especially tourmalines. Emerald deposits near Bogotá, which originally led to the Spanish conquest of that section, still supply most of the world's emeralds. Pearl beds also occur near the Venezuelan coast.

Coal and iron, the foundations of modern industry, do not fit into the plan of life in tropical South America, where people are still in large measure children of nature, content to exist on the spontaneous products of the earth. Important coal fields, however, exist in southern Brazil; smaller areas occur along the Caribbean and in all the Andean states. Near Bogotá, where coal, iron, and limestone lie side by side as in Alabama, only a little iron is smelted.

Petroleum wells are in operation near Payta, and crude oil serves as fuel on some of the railways in Peru. The oil field is said to extend along the sea for a hundred or more miles. Asphaltum, formed by petroleum long exposed to the air, is very abundant in Venezuela.

Monazite, used in Welsbach gas mantles, is exported from Brazil, and guano from arid islands adjacent to Peru.

286. Manufactures in Tropical South America. In view of the primitive mode of life, most common articles are made by hand, for example, pottery and leather goods. Panama hats, so called because shipped through Panama, are plaited by Indians in Ecuador from the leaves of a screw pine. Some cotton mills, however, are at work in Peru and Brazil. The latter country has tried to start other industries, such as flour milling and shoe making, by means of a high protective tariff which raises the prices obtained by manufacturers.

FIG. 188. *Llamas in Peru, waiting for their loads.*

In each of the mountain systems there is enormous water power waiting to be harnessed. For example, the descent near La Paz, the commercial center of Bolivia, is 10,000 feet in a few miles. Water power is naturally most abundant along the mighty eastern wall of the Andes, but this region is at present almost uninhabited.

287. Internal Transportation in Tropical South America. Only a neglected and dangerous mule path, where a mounted

postman is said to have been drowned in mud, connected (until 1908) Quito, the capital of Ecuador, with its port of Guayaquil. This is a fair sample of transportation facilities away from the rivers and railways. In Peru and Bolivia, the llama (Fig. 188), donkey, and mule are the usual beasts of burden from the railways back into the interior.

The Pacific streams, being short and rapid, are useless for navigation. The Orinoco on the other hand is navigable to Cabuyaro, less than eighty miles in a direct line from Bogotá; and the Amazon is navigable for seagoing vessels to Iquitos in Peru, while smaller vessels reach a point (Pongo de Manseriche) within 450 miles of the Pacific. Two-thirds of South America lies in the valleys of the Orinoco, Amazon, and La Plata, and these valleys are separated by barely perceptible water partings. It is in fact possible at high water to pass by boat from the Orinoco system into the Amazon.

In numerous places, short railways run inland from the ports to bring out the crops; and in the chief coffee districts around Rio de Janeiro and Carácas these lines form connected systems.

In Ecuador, a railway extends from Guayaquil to Quito, and in Peru two railways cross the Western Andes above the clouds.[1] The Lima-Oroya line is the highest standard gauge railway in the world (14,666 feet); the Mollendo line connects with steamers on Lake Titicaca, a sheet of water nearly half the size of Lake Erie, and these again connect with a railway for La Paz; from Puno the Cuzco section of the Mollendo line strikes off northward. All the north and south lines on the Andean plateau form links in the great Pan-American Railway between New York and Buenos Aires, which is slowly becoming an accomplished fact.[2] Bolivia has undertaken to unite the several lines on the plateau, and also to connect La Paz with

[1]Another is projected to run from Payta, Peru, over the lowest pass (7,170 feet) in the central Andes, to Pongo de Manseriche (about 450 miles), the head of navigation on the Amazon.

[2]Pepper, *Report on the Pan-American Railway*, shows that in 1903 only 4,700 miles were lacking, and that many links were building.

the navigable Beni, while Brazil has built a line around the falls of the Madeira, in order to open another outlet for the commerce of Bolivia—the landlocked Tibet of South America.

288. The Principal Ports of Tropical South America. The Caribbean coast of South America is somewhat broken by spurs of the Andes projecting into the sea. The leading ports on the Caribbean are Georgetown in the Guianas; La Guaira, which is the port of Carácas, on an artificial harbor; Puerto Cabello, the port of Valencia, on a fine natural harbor;[1] and finally, Barranquilla and Cartagena, the rival outlets of the Magdalena River, which forms the great highway

Courtesy of International Bureau of Republics

FIG. 189. *View of the harbor of Rio de Janeiro, showing its landlocked character.*

into the interior[2] of Colombia. Both rely on railways to get goods to and from the river, as the delta is not navigable, but Cartagena has the only safe harbor.[3]

[1]Others are Guanta, the port of Barcelona; Tucacas, the port of Barquisimeto; Maracaibo, which is, however, cut off from the sea by a shallow bar; Santa Marta, the port of a banana district; and Ciudad Bolivar, on the Orinoco.

[2]As far as La Dorada, some 600 miles up; and again on the upper river above Honda. The rapids above La Dorada are passed by rail; and another line connects the head of navigation on the upper river with Bogotá.

[3]Cartagena is on the coast; Barranquilla is on the river. Barranquilla ships goods by rail to Sabanilla (Port Colombia), an exposed roadstead where they are transferred to vessels.

On the Atlantic coast there are deep bays at Bahia, the ancient capital of Brazil, and at Rio de Janeiro, the capital and metropolis of Brazil and the second city in South America. (Fig. 189.) Bahia is the terminus of a railway which connects with the navigable São Francisco River above the falls. Pernambuco is fairly sheltered by a coral reef, whence is derived its other name Recife. Santos, a river port, is the principal shipping point for coffee, by virtue of its position near the coffee district; and it may in time supplant Rio as the commercial center of Brazil. These four are the chief Brazilian seaports. On the Amazon there are two important rubber ports, Pará (Belem) and Manaos, the latter a thousand miles inland like Montreal. Ceará also ships some rubber.

On the Pacific the only considerable inlet is at Guayaquil, where a bay breaks through the coast range. Another small bay at Buenaventura became the natural outlet of the densely-peopled Cauca Valley, when the railroad was completed from Buenaventura to the Cauca River The other harbors on the Pacific are merely roadsteads very imperfectly sheltered by small islands or projecting points of land. Such is Callao, the port of Lima and the chief port of Peru.

Islands of any considerable size are conspicuous by their absence on the Pacific coast of northern South America, the only group being the Galápagos (3,170 square miles).[1] These are of volcanic origin and barren near the sea but inclose several deep, well-sheltered anchorages, and are said by naval authorities to offer the only feasible site for a coaling and naval station on routes from south of the equator to the Panama Canal.

[1]Here Captain Porter made his headquarters for a time during his famous cruise in the "Essex" (1813). A colony was later established (1832) by an American, named Vilomil, from Louisiana. During the Harrison administration, Mr. Blaine tried to secure a coaling station on the Galápagos Islands. Though claimed by Ecuador, these islands are practically unoccupied.

289. Physical Features of Temperate South America. Temperate South America embraces most of the four southern countries. The three southern states of Brazil also have more in common with Argentina than with tropical Brazil.

The temperate region east of the Andes is a vast plain, except in southern Brazil, which is an elevated plateau traversed by low mountains. Chile, comprising the southern Pacific slope, is equal in area to all the Atlantic states north of the Carolinas. It consists, like California, chiefly of a great valley; but the Chilean Coast Range, unlike the Californian, is pierced by many rivers which open pathways for railroads from the interior to the sea. (Fig. 181.)

290. Climate of Temperate South America. Being in the southern hemisphere, the climate is hot toward the north, cold toward the south, and midwinter in Argentina is midsummer in the United States. Chile is thus a reversed copy of the Pacific coast of North America from Lower California to Alaska, while Argentina corresponds to the region from central Mexico to Hudson Bay. The tapering form of the continent with a cold ocean current on the west and a warm current on the east, narrows the belt of temperate climate to practically ten degrees of latitude (30° to 40°). For this reason Buenos Aires, in the latitude of Memphis, has substantially the climate of New Orleans, while Valdivia, not far from the latitude of San Francisco, has the climate of Sitka.

Abundant rainfall (forty inches or more) is brought by the prevailing trade wind in northeastern Argentina, and also by the prevailing westerlies in Chile south of Concepcion; but most of Argentina south of 35° (that is, in the zone of prevailing westerlies), since it lies in the lea of the Andes, is too dry for tillage, and in parts too dry even for pasturage. (Fig. 15.) South of 40° however, where the mountains are

lower and the west winds stronger, there are some grasslands and even patches of timber in the lake district along the eastern base of the Andes.

291. Forests of Temperate South America. As a result of this distribution of rainfall, there are two important forest areas in temperate South America: Paraguay and northern Argentina, where the forest is subtropical in character; and southern Chile, south of Concepcion, which is pine-clad. The most valuable subtropical wood is quebracho, whose bark is a powerful tanning agent, while the wood itself rivals teak in durability. Chile also exports considerable gum (*goma brea*) used in mucilage. In spite of these forests, pine lumber is largely shipped from North America to Chile.

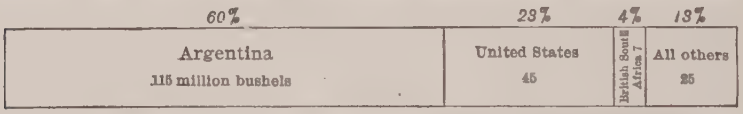
In the colder districts, both on the Andean plateaus and toward the south of Chile, is found the chinchilla, a small animal yielding a valuable fur.

292. Stock-raising in Temperate South America. South of about 30° S., the rainfall on the plains east of the Andes Mountains is insufficient to support forests. These plains in Uruguay and Argentina are natural grasslands, or pampas. The chief industry is consequently the raising of stock, especially cattle. The dairy industry has made considerable progress in Argentina, where improved breeds of cattle have been introduced. Argentina also ranks high in the number of sheep, though they are rather of the mutton than the wool type. (Fig. 39.) Both in Uruguay and Argentina the Spanish element, true to its traditions, prefers pastoral pursuits, especially as refrigerator ships have made the stock industry very profitable. Considerable American capital is also invested in the grazing and meat-packing industries.

In central Chile the foothills and the higher mountain valleys serve as pastures. South of Puerto Montt, in the belt of stormy westerlies, where the weather is so cloudy that even barley will not ripen, sheep are the main resource, supplemented by lumber, fish, and chinchilla fur. For the same reason, the Falkland Islands are mostly sheep runs.

293. Crops of Temperate South America. Maté or Paraguay tea is the most important product of a large district where Paraguay, Argentina, and Brazil meet. It is the leaf of an indigenous tree, which grows wild, and is extensively used throughout South America in place of coffee or tea. Other products are oranges and tobacco in Paraguay, and sugar cane around Tucuman in northern Argentina.

West of about 64° in Argentina, the rainfall is less than twenty inches, as in the Great Plains region of the United States. The same condition also exists in Chile north of about 35°, just as in southern California. Agriculture in these districts is consequently limited in the main to irrigated areas. On the Andean foothills, both in Chile and Argentina, between 30° and 35° irrigated vineyards and orchards have been planted, largely by French and Italians. During the season special fast fruit trains run from Mendoza to Buenos Aires.



Data from Year Books of Agriculture

FIG 190 *Exports of corn including corn meal. Total, four-year average: 192 million bushels. Statistics for Russia and Rumania not available.*

Outside these arid belts, field crops have made considerable progress, both in Chile and Argentina, though little in Uruguay, notwithstanding it is the best watered. The most important are wheat, corn (Fig. 43), and alfalfa, the latter a forage crop which is fed to stock. Potatoes and barley are also grown in Chile, and flaxseed in Argentina. (Fig. 97.) The principal grain-growing district lies east of Córdoba in Argentina, between 30° and 35° of latitude. The export of wheat and corn (Fig. 190) from this region is a large item in international commerce, though only an insignificant part of the arable land has passed under the plow. In the future, when the food products of the United States are mostly consumed at home, Canada, Argentina, and Siberia will be the granaries of the world.

Agriculture is still, however, for the most part carried on by recent European immigrants; in Uruguay, where there are few immigrants, there is little agriculture. The greatest obstacle to its rapid development is the aristocratic organization of society. Throughout Latin America a few wealthy families own all the good land and hold the mass of the people in utter subjection, ruling their estates like feudal lords.

294. Mineral Products of Temperate South America. Several gold and copper mines are in operation around Rioja; the south Brazilian coal field extends into Uruguay; and another coal field, associated with petroleum, lies along the eastern flank of the Andes near Mendoza. As yet, however, owing to the distance of these deposits from the centers of population, and the lack of transportation facilities, the mineral output of Uruguay and Argentina is insignificant.

Chile, on the other hand, abounds in minerals, which furnish her chief exports. The principal copper-producing district in South America (Fig. 138) lies along the base of the Andes, especially between Copiapó and Santiago, the ore in places carrying also gold and silver. Coal fields line the coast for a hundred miles around Coronel, the chief coal port. This coal is the best hitherto mined in South America, and lies near deposits of iron ore. It is still true, however, that Chile burns more coal than she mines. Finally, by the war with Bolivia and Peru, Chile acquired (1884) the Atacama Desert, which is amazingly rich in nitrate salts.

The success of Chile in this war (1884) was no doubt due to the character of her people, recruited from the northwestern provinces of Spain and inheriting their "energetic and warlike temperament." Peru on the other hand was settled mainly by a softer stock from Andalusia, and it lies within the Tropics. The nitrate trade made Chile rich and powerful. But her statesmen, realizing that the nitrate will soon be exhausted, are promoting other industries in order to put Chile on a sounder basis.

295. The Nitrate Industry. Of the three elements often lacking in soils (§117), nitrogen is, next to phosphorus, the element most easily exhausted and most difficult to restore. This fact explains the great importance to the world of the Chilean nitrate of soda deposits. They probably represent fossil guano deposits which have been preserved through the ages by the dryness of the climate.

The industry is carried on by foreign, largely English, capital and native labor, and is controlled by a "trust" which effectively eliminates competition and maintains prices at the point of maximum net profit to the producers. An export tax on nitrates is the chief source of revenue for the Chilean government.

The bulk of the nitrate exports goes to Europe, where the soil is farmed intensively. This trade, giving cheap return freight on goods from Europe was, for some years, one cause of European predominance in South American markets.

296. Manufactures of Temperate South America. Temperate South America, like the tropical sections, is still in the "extractive" stage of industry; that is, furnishing food and such raw materials as wool, hides, and minerals. Manufactures are, however, making progress, using chiefly native raw materials. Examples are: the preparation of beef extract at Fray Bentos in Uruguay, and of *tasajo* or jerked beef; canned, frozen, and chilled meats; also the grinding of wheat, the refining of sugar, the tanning of leather, and the weaving of cotton and coarse woolens. In fact temperate South America is producing each year, larger quantities of the necessaries of domestic life.

Chile, having coal near the sea, and many swift rivers descending from the Andes, enjoys marked advantages for manufacturing. She has modern steel works at Corral near Valdivia, where iron ore occurs, and copper smelters at Coronel. In addition, there are chemical works producing iodine and borate of lime, in connection with the nitrate industry.

297. Internal Transportation in Temperate South America. The La Plata system offers several thousand miles of river

navigation. The Uruguay River is, indeed, broken no great distance inland at Salto (the Falls); but the Paraguay is navigable to Cuyabá in Brazil, forming the only outlet of a vast region. It is especially important for the shipment of wheat from Argentina.

The level surface of the pampas favors railroad construction. In Argentina, especially, the railroad system is already extensive and rapidly growing. One trunk line traversing a tunnel under the Uspallata Pass[1], connects with the Chilean railroads, thus saving ten days over the route by sea between Buenos Aires and Valparaiso, though the grades are heavy and a difference in gauge compels transhipment. Another road extends southwest to the foothills of the Andes, toward the lake district of Argentina, where a low pass[2] opposite Valdivia offers another and easier route to the Pacific. A third line, undertaken according to a treaty with Bolivia, climbs the Bolivian Plateau from Jujuy, Argentina, and will eventually connect with the Antofagasta line at Uyuni, thus forming a link in the Pan-American Railway.[3]

Smaller railway systems exist in Uruguay and Paraguay, now connected with the Argentine system.

The railways of Chile are for the most part short lines running down the river valleys from the Andes Mountains to the sea; but a longitudinal railway has recently been completed from Puerto Montt, north along the coast through Iquique and to Pisagua. The line from Antofagasta crosses the western divide of the Andes to the Bolivian Plateau; at the same time a more direct line has been opened (1912) from Arica to La Paz. This is intended to maintain control of Bolivian commerce in spite of the Argentine line; and its commercial value will be increased by the Panama Canal. Whatever nation

[1] Uspallata Pass, 12,464 feet elevation. The line is 893 miles long from Buenos Aires to Valparaiso, reaching an elevation of 10,365 feet.

[2] The Bariloche, only 2,760 feet elevation.

[3] Reaching the plateau through Tres Cruces Pass, elevation 12,215 feet. Part of the way cogged rails have to be used.

dominates the Bolivian Plateau will have made a long stride toward a controlling position in South America.

298. The United States of South America. The map of South America is not fixed for all time; for with every day that passes the present political condition, based on the difficulties of travel and transportation before the days of steam, becomes more of a burden to commerce. The marshy and torrid valley of the Amazon, and the towering masses of the Andes, do indeed form natural boundaries; but the political divisions existing in temperate South America, east of the Andes, are wholly unnatural. Railways are the advance agents of conquest, commercial and, in the end, political. The recent extension of the Argentine railways with the systems in the adjacent countries must, therefore, tend to draw at least Paraguay and Uruguay into the Argentine sphere of influence. Neither of these countries has, in fact, any present reason for separate existence, and both would profit commercially by inclusion in Argentina, the true United States of South America.

299. The Chief Centers of Commerce in Temperate South America. The Atlantic coast is sandy south of Santos and lacks first-class natural harbors.

Rio Grande do Sul and Porto Alegre, the ports of southern Brazil (both situated on a great lagoon) are cut off from the sea by a bar carrying only a few feet of water. The La Plata estuary is wide, shallow, and entirely unprotected by nature; here, however, centers most of the foreign commerce. Montevideo is the natural outlet of the country between the Uruguay River and the sea, being separated by a wide estuary from Argentina. Buenos Aires (Fig. 191), by far the largest city in South America, and exceeded in size by only three in the United States, is the chief port of Argentina. It has a fine artificial harbor, and the completion of additional railway lines to Chile and Bolivia will render it the commercial center of nearly all temperate South America. An "outport" has also been built at La Plata for the larger vessels. The principal river ports are Rosario in the wheat belt,

accessible to ocean vessels of moderate draft, and Asuncion in Paraguay. Bahia Blanca, on the best natural harbor in Argentina, also has a rapidly-growing trade with Europe.

Most of the commerce of Chile (Fig. 192) passes through three ports: Iquique, the principal nitrate port; Antofagasta, one of the Chilean ports of Bolivia; and Valparaiso (Paradise Valley), the port of the capital, Santiago. All are exposed roadsteads, often storm-swept.[1] The fiord-like southern coast of Chile has many harbors but, owing to the broken surface and

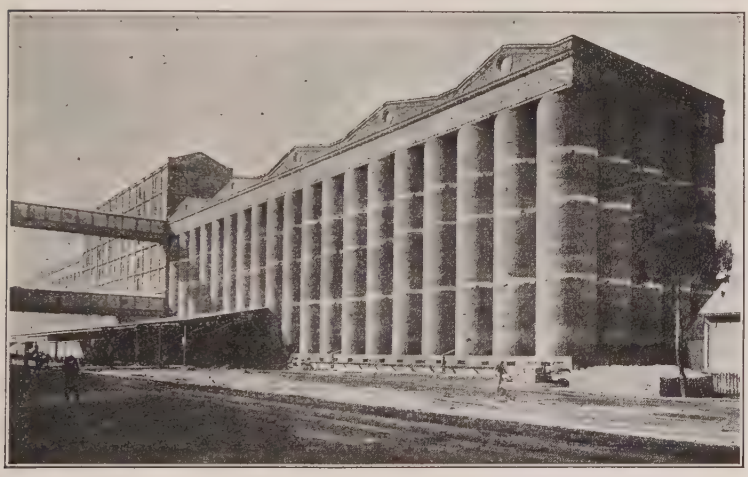


FIG. 191. *Modern wheat elevator in Buenos Aires.*

unfavorable climate, the land is relatively unproductive. Punta Arenas, in the Strait of Magellan, is however an important coaling station.

Great Britain, with her usual foresight or good luck, secured in the Falkland Islands a site for another coaling station adjacent to the Strait of Magellan.

300. Commercial Relations of South America. South America exports chiefly coffee, rubber, wool, hides, metals, and other raw materials, besides foodstuffs; and imports

[1]In 1903, for example, the fine steamer "Arequipa" was lost in Valparaiso Harbor with nearly a hundred on board.

mostly manufactured goods, especially textiles and steel wares, such as are made in the United States, also foodstuffs in the tropical section.

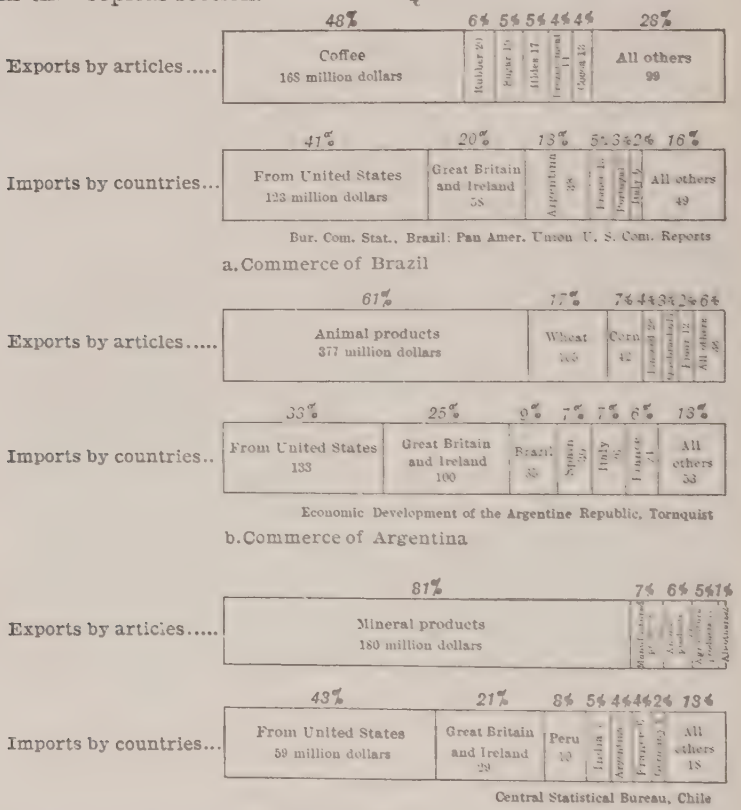


FIG. 192. *Commerce of Brazil, Argentina, and Chile. Totals (millions of dollars): Brazil five-year averages, exports, 350 (40% to U. S.): imports, 207. Argentina, three-year averages, exports, 610, largely to Great Britain and U. S.; imports, 401. Chile, five-year averages, exports, 223, largely nitrates: imports 137. Imports to all* ***are largely foodstuffs, textiles, iron and steel goods.***

The United States had failed to make headway against England or Germany in South America before the World War. This is

shown by the fact that the share of the United States in South American trade, except on the Caribbean, is not much over a

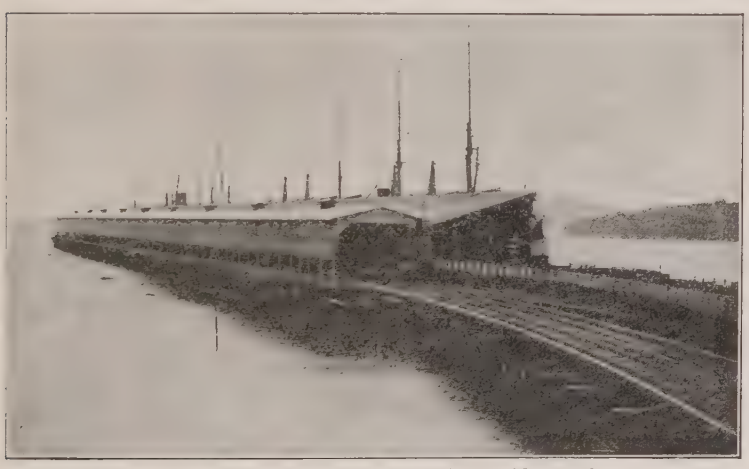


FIG. 193. *Steel pier at Balboa, the Pacific terminus of the Panama Canal.*

tenth of the total. (Fig. 192.) Moreover, the trade of the United States in South America has developed relatively little in thirty years, and during that time the United States has bought in South America nearly two billion dollars' worth of goods more than it has sold there. In fact, the United States sold in 1912 more than twice as much to Canada as to the whole continent of South America. (Tables 4 and 6.)

One reason is geographic. South America should rightfully be called East America, from the fact that it lies entirely east of Florida. A sailing vessel from Hamburg, coming with the northeast trade wind, has an advantage of some ten days over a ship from New York. Another reason is that sentiment in South America favors Europe, owing to the many European firms and the millions of European immigrants settled there. Again, American business methods are at fault. Catalogues in English are sent in place of agents, and to places where English is unknown; goods are put in

large boxes for districts where pack mules are the only means of transportation; no credit is given, because there is in most places no American bank or agency to report who is worthy of credit; and American consuls sometimes lament the loss of promising markets by downright fraud on the part of the sellers. Finally, American manufacturers have been so busy making goods for the home market, where they enjoyed a practical monopoly through the protective tariff, that they felt little inclination to enter foreign markets, where they would have to sell their goods at competitive prices.

In striking contrast to such methods is the procedure of German exporters. They have organized the German Transoceanic (*Deutsche Ueberseeische*) Bank of Berlin, with branches throughout Central and South America; and they have flooded the country with German agents. These are invariably men of good commercial education, speaking fluently the language of the country and thoroughly posted as to the social customs and exacting etiquette of the Latin-Americans. They do business on a marvelously small margin, giving long credits and pushing German goods always and everywhere.

On account of location, Brazil and all the Atlantic countries will probably remain commercial dependencies of Europe. On the Pacific coast, however, the Panama Canal has canceled the geographic advantage previously held by Europe, since it brings American ports much closer than any European port. (Fig. 193.) Even the acquisition of the Panama Railroad by the United States sufficed to break up a combination which kept rates across the isthmus so high that American goods could reach Peru more cheaply by way of Germany and Cape Horn than by way of Panama.

Finally, the Pan-American Railway, following the ancient highway of the Incas through the densely-peopled Andean plateaus, will in a measure tend, when completed, to draw the whole of western and of temperate South America within the commercial domain of the United States.

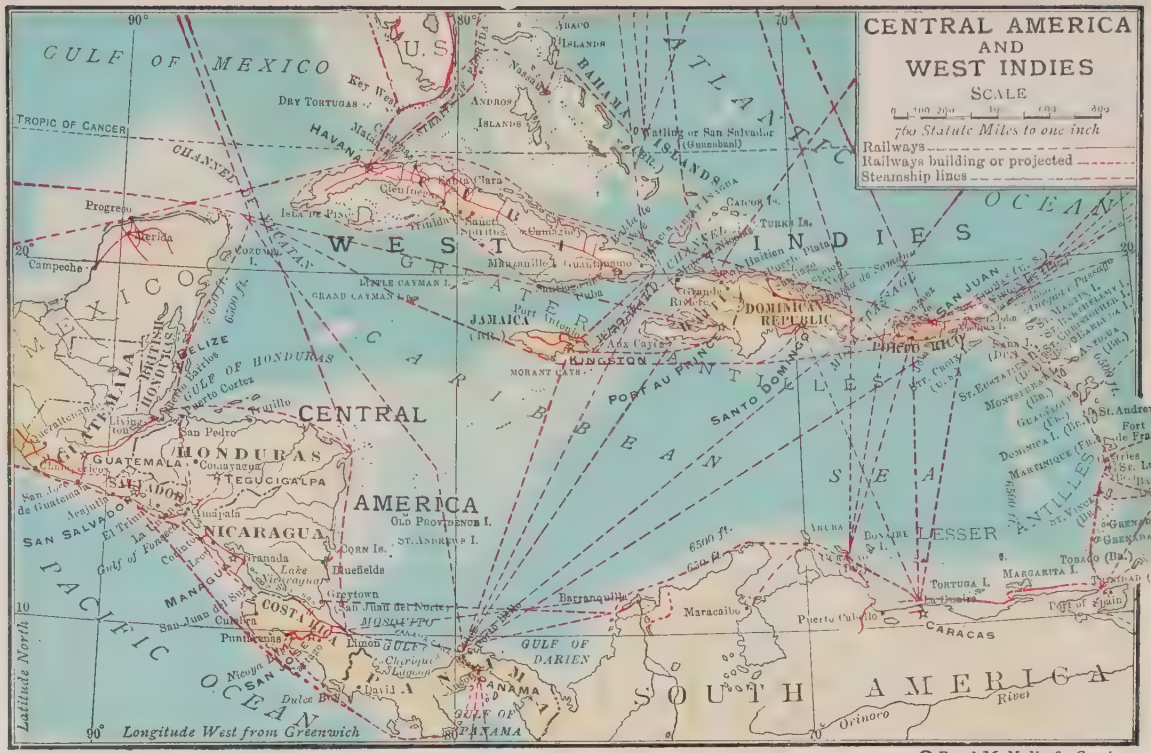


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FIG. 194. *Central America and the West Indies.*

OCEANIA
SCALE
0 200 400 600 800 1000
1,025 Statute Miles to one inch
Railways
Railways projected
Steamship lines
Navigable rivers
Longitude East from Greenwich
Latitude North
Latitude South
TROPIC OF CAPRICORN
INDIAN OCEAN
BAY OF BENGAL
SOUTH CHINA SEA
BURMA
FRENCH INDO-CHINA
SIAM
BANGKOK
Gulf of Siam
Hong-kong
TAIWAN (FORMOSA)
PHILIPPINE ISLANDS
MANILA
CAROLINE
(To U.S.)
BRUNEI
BORNEO
SUMATRA
Singapore
KUCHING
Banjermasin
CELEBES
Macassar
Surabaya
(DUTCH)
JAVA
BATAVIA
Benkulen
Menado
TIMOR (PORT.)
Port Darwin
Darwin
NEW GUINEA
Cooktown
Normanton
NORTHERN TERRITORY
WESTERN AUSTRALIA
QUEENSLAND
AUSTRALIA
SOUTH AUSTRALIA
Northampton
Coolgardie
Perth
Fremantle
Albany
Great Australian Bight
Adelaide
VICTORIA
Melb
Launceston
Hobart
13000 ft.
6500 ft.
BONIN IS. (JAP.)
MARIANNE
YUNNAN
HANOI
TONGKING
HAINAN
Hue
Khong
Saigon
CAMBODIA
PALAWAN
Hollo
SAMAR
YAP
PELEW IS.
MINDANAO
SULU IS.
BRIT. NORTH BORNEO
Billiton
Bangka I.
Tanjong Priok
Port Moresby
Port Darling
Port Phillip
Gulf of Carpentaria
Brokenhill
Darling R.
Port Hamilton
SOUTH WALES
80° 100° 120° 140°
20° 0° 20° 40°

FIG.

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Oceania.

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FIG. 196. *The Philippine Islands.*

XXI—OCEANIA AND AUSTRALASIA

301. The Ocean World. The greatest of all oceans did not prove an effective barrier to the migrations of men. Long before the first European had crossed that wilderness of waters (Magellan, 1521), the natives of the Pacific isles sailed the seas with no more fear than the Indians roamed the western plains.

The existing races of Oceania, except the whites, came from the west. In the eastern islands are now found the Christianized Polynesians; from Fiji to Flores, the cannibal Melanesians (blacks); from Flores north and west, the Mohammedan Malays. Many people, however, believe that the mysterious monuments scattered over the Pacific, such as the huge images of stone on Easter Island, the remains of a temple on Ponape in the Carolines, and the massive stone pillars on Tinian north of Guam, represent a lost race or at least a lost civilization, destroyed by encroachments of the sea.

In any event, the land in the Pacific has beyond question been slowly sinking for ages. Borings on the Ellice group [illegible] own over 1,000 feet without finding the bottom [illegible] shown by their geological structure to be fragments severed from the adjacent continents. It is further evident, from the plants and animals inhabiting the islands, that the first break between Asia and Australia occurred at the deep strait which now separates Bali and Lombok.

The innumerable small islands of Oceania are of two distinct types: "low" and "high," the one of coral and the other of volcanic formation. They lie for the most part in a few chains roughly parallel to the shores of the continents, each chain being the tip of a gigantic wrinkle in the earth's crust

302. The Partition of Oceania. Excluding the islands from New Guinea west, which are mostly Dutch and properly go with Asia, Oceania is now divided among three nations besides the United States. Only the New Hebrides remain under joint French-English control. (Fig. 195.)

After annexing Australia (1788) and New Zealand (1840), England adopted the Cobden theory that Free Trade would soon render colonies useless. This dream enabled France and Germany practically to take their pick of the remaining islands, for the United States, as Captain Mahan says, "had not yet begun to sit up and take notice."

The French dominions spread from three centers: Tahiti (1838), Uea, or Wallis (1844), New Caledonia (1853). Several islands were acquired with express reference to the future Panama Canal.[1] Tahiti, lying on the direct route between Auckland and Panama, is a French coaling station and port of call corresponding to Hawaii in the north Pacific.

Germany annexed the Marshall group and part of New Guinea (1885). By the purchase from Spain of the Caroline and Marianne islands (1899), and the partition of Samoa (1900), she acquired a solid block of possessions with excellent harbors (§228) and commanding all routes across the western Pacific. Germany held these islands until the World War.

303. The Commerce of Oceania. The principal commercial products of the "low" or coral islands are copra, and various substances from the sea, especially pearls and pearl shells, tortoise shells, shark fins, and trepang (*bêche-de-mer*), a hideous sea slug. The last two are much prized by the Chinese.

These low islands, being in many cases the resort of myriads of sea birds, have yielded much guano, a valuable nitrogenous fertilizer. Some of them also contain immense phosphate

[1] Especially the Marquesas group where Captain Porter raised the American flag (1813), and Clipperton Island near the Mexican coast.

deposits, originally derived from guano, and large shipments of phosphates from these islands have recently begun.

The volcanic islands, being lofty, are well watered even in the trade-wind belt. In addition to coconuts, sugar cane and bananas are grown in Fiji, cocoa (cacao) in Samoa, vanilla and fruits in Tahiti. These islands are all capable of commercial development. They trade mainly with Sydney, Auckland, and San Francisco.

The continental islands have a still wider range of interests. New Caledonia, lying just within the Tropics like Hawaii, is relatively cool and dry. Its annual rainfall, in fact, is only forty-six inches. New Caledonia consequently has a considerable white population, including some convicts—as the island is a penal station—and produces coffee, cattle, and tobacco. In addition, there are mines of nickel, chrome, and cobalt ores, which constitute its chief exports. New Guinea on the other hand, is only partially explored because of its deadly climate and cannibal inhabitants. The forests, however, furnish sandalwood and rubber. In the English section gold is mined, and some land has been planted to coconuts, rubber, and sisal.

The principal commercial centers of Oceania, besides Hawaii, are Yap in the Carolines, which has cable lines to Menádo, Guam, and Shanghai; Tahiti in the Society group and Numea in New Caledonia, both belonging to France; Apia in Samoa is controlled by New Zealand; and Suva in the Fiji Islands, a British possession. Numea is a modern city with electric lights and street cars, and a railway to Paita.

304. British Australasia. Australia and Tasmania are federated like Canada, while New Zealand remains separate like Newfoundland. The three constitute British Australasia.

The people are almost exclusively of British descent, and they enjoy practically complete self-government. In consequence, their free and devoted loyalty, like that of Canada, is something unique in history. During the Boer War, for

example, they sent troops of their own accord, and again in the World War the Anzacs—Australian and New Zealand soldiers—came to her help and fought at their own expense.

305. Surface and Climate of Australasia. In respect to latitude, Australasia corresponds to North America from Panama to Portland, Me.

Australia lies mostly in the trade-wind zone (§51), and its surface is shaped much like a saucer. The mountains near the eastern shore thus condense most of the moisture from the southeast trade wind on the seaward slope. This same wind, however, descending toward the interior, is a drying wind, which leaves three-fourths of the continent too dry for agriculture and much of it too dry even for stock raising (§44). Thus originates the "Dead Heart of Australia." There are, moreover, violent fluctuations in the rainfall from year to year, which sometimes cause widespread crop failures. The tropical section has, however, a regular rainy season in summer when the equatorial belt of calms and rains moves south; while Tasmania and New Zealand, lying in the zone of westerly winds, have a temperate oceanic climate much like that of England.

306. Forests and Fisheries of Australasia. New Zealand is heavily timbered on the western slope, where the rainfall is most abundant. Kauri pine is the finest native wood, and Kauri gum, obtained from the earth where forests formerly stood, is an important export. The Australian forests contain durable varieties of eucalyptus, but little pine. They have been much reduced by ring barking the trees to provide pasturage for stock. This policy has in the large run proved suicidal, as the grass soon deteriorates in that climate without forest protection.

The commercial fisheries are along the northern coast, especially around Thursday Island. They yield, as in Oceania, chiefly pearls, pearl shells, and trepang.

307. The Stock Industry in Australasia. Australia is rather pastoral than agricultural. (Fig. 198.) Moreover, being a

country of floods and droughts, made worse by destruction of the forests, the losses in dry seasons are enormous. It is estimated that 40,000,000 sheep perished during the great drought of 1901-2. Sheep are most numerous in New South Wales, horses and beef cattle in Queensland, and dairy cattle in Victoria, where the pastures are better watered. The chief product is wool. (Figs. 197 and 198.) Both sheep and cattle thrive in New Zealand. The stock industry profits from milking machines and from refrigerator ships which land butter and meat in London in prime condition. There is also a large trade in provisions with India, and all southern Asia.

FIG. 197. *Ox teams hauling wool to market, Darling district, Australia.*

Rabbits, once a national pest, are also exported frozen, by the shipload. Victoria alone has utilized 20,000,000 of them for meat and fur in a single year.

308. The Crops of Australasia. In Australia, the great enemy of agriculture is drought. Tillage of the soil is practically confined, in the temperate section, to the eastern slope, and to the region of westerly winds south of latitude 35°. The largest acreage of plowed land is under cereals, especially wheat; but by reason of the capricious climate, Australia is not a reliable exporter of grain. (Fig. 198.) In dry years heavy imports of wheat are necessary.

Oranges, olives, and grapes are also extensively cultivated around the cities of Sydney and Adelaide. Australian raisins

compete sharply with those of California. In the tropical section north of Rockhampton, Queensland, which is a thinly-peopled frontier district, there is some production of sugar cane, corn, and fruit, especially bananas. Cotton culture has also begun. The plantations there are still worked to some extent with colored contract labor; but the temperate South insists that "all Australia must be a white man's country," and further colored immigration is practically prohibited.

In Tasmania and New Zealand, which are cooler and moister, oats, barley, and potatoes are grown, besides all temperate fruits. Tasmania has become an important source of apples for the London market during the northern winter. New Zealand has also a native swamp fiber, called phormium or New Zealand flax, which is of some commercial importance.

309. Mineral Products of Australasia. The discovery of gold (1851) quickly populated Australia as it did California, and Australia continues to be one of the great gold fields of the world. (Figs. 138 and 198.) The district near Melbourne, where gold was first mined, is still important, though western Australia now has the largest output. New Zealand also produces gold, largely from placer deposits worked by means of floating dredges.

The tin-producing belt of the Malay Peninsula is apparently continued through eastern Australia to Tasmania, accompanied by copper. (Fig. 219.) The famous Broken Hill mines produce silver, lead, and zinc. Australia ranks close to Chile in the production of copper, and stands among the leading countries of the world in silver. (Fig. 138.) Iron occurs both on the mainland and in Tasmania.

Coal of good quality is widely distributed, but the chief output is around Newcastle and in New Zealand. Being convenient to water transportation, it is shipped to all parts of the Pacific, especially to Chile and the United States.

310. Manufactures of Australasia. Australasia, like South America, is still occupied chiefly in furnishing food and raw materials.

It is true, however, that protective tariffs have been enacted to stimulate industry; and that manufactures connected with meat, wool, and leather have obvious advantages. An efficient agent is at hand for tanning in the native black wattle. Smelting works near the Newcastle coal field, especially at Littegow, are also advantageously situated, though little use has been made of native iron.

311. Transportation in Australasia. The interior of Australia is largely a closed basin draining into salt lakes. The rivers are mostly short and rapid; even the navigable Murray is almost dry at times. The Great Barrier Reef, however, provides sheltered coastwise navigation on the east for over a thousand miles.

Internal transportation consequently depends on railroads. These are chiefly owned by the several states, and form a connected system only in eastern, southern, and western Australia. Moreover, several of the states have different gauges, thus compelling passengers and goods to change cars at the state boundaries.

A north-and-south transcontinental railway is being built by the Commonwealth of Australia from Adelaide to Port Darwin, and an east-and-west line from Adelaide to Perth was completed in 1917. In New Zealand and Tasmania trunk lines already traverse the islands from north to south.

312. Commercial Centers of Australasia. The shape of Australia is singularly massive, and vast stretches of coast lack any indentation capable of sheltering a ship; yet there are several harbors which have no superiors in the world.

As a result of this coastal formation, many commercial cities are river ports a few miles from the sea,[1] and the seaports which do exist have received distinctive names. Thus Port Phillip is the harbor of Melbourne, Port Jackson of Sydney, Port Curtis of Gladstone, Port Hunter of Newcastle. Port Darwin is the harbor of Darwin (formerly Palmerston).

[1] The principal river ports, with their distances from the sea, are: Hobart, 12 miles; Launceston, 40; Brisbane, 17; Rockhampton, 35; Perth, 12.

The former metropolis was Melbourne, in the most fruitful part of temperate Australia; but this rank is now held by Sydney, located on the finest harbor in the world, which is the terminus of many steamship lines. These are the two great commercial centers of Australia. Both are of astonishing, in fact abnormal, size for so young and so sparsely-peopled a country. Other important commercial cities are Newcastle, the principal coal port; Brisbane, the leading port in Queensland; Adelaide, in South Australia; and Fremantle, on an artificial harbor near Perth, in West Australia. The first and last ports of call are Fremantle on the southern, and Thursday Island on the northern, route to India and Suez. Albany occupies a similar position on the route to the Cape of Good Hope. Port Augusta, at the head of Spencer's Gulf, is on the east-and-west transcontinental railway, and Port Darwin in the north will become important when connected with it.

The principal ports in Tasmania are Hobart in the south and Launceston in the north, both on tidal rivers accessible to sea-going vessels. In New Zealand the chief commercial centers are Auckland, where the routes from Sydney and from San Francisco converge, and Wellington, on the strait separating the two main islands. Both have harbors that are deep, safe, and spacious. Auckland, by reason of its position, will naturally become the main port of call between Sydney and Panama.

313. Colonies and Commerce of Australasia. Both Australia and New Zealand, though rather young to aspire to motherhood, have colonies. Australia administers British New Guinea (Territory of Papua) and other British islands west of Fiji. New Zealand has taken over most of the British islands east and northeast of Tonga.[1]

The foreign commerce of Australasia consists mainly in the export of wool, metals, meat and other animal products, and

[1] These embrace the Cook Islands, nine in number, also Niue, Palmerston, Manahiki, Rakaanga, Danger, and Suwarrow islands; total area 280 square miles, population, 13,000. The last named, though a coral atoll, has a deep lagoon harbor, commodious and perfectly sheltered. Practically all of these islands were formerly occupied by Americans under the Guano Act (§227).

the import of manufactured goods. The bulk of the commerce is with Great Britain. (Fig. 198.) One reason for this fact is that the Isthmus of Panama until recently forced goods from New York to go by way of the Suez Canal or around Cape Horn.

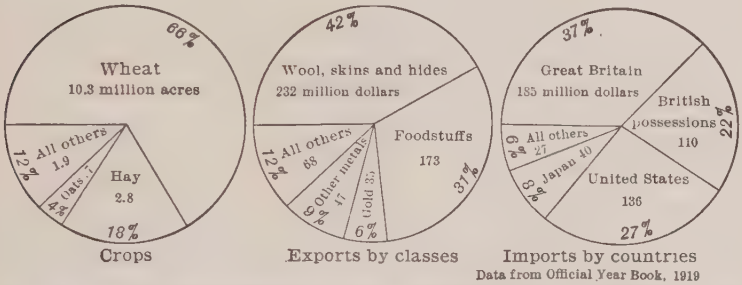


FIG. 198. *Crops and commerce of the Commonwealth of Australia. Land in crops, five-year average, 15.7 million acres, or 0.8% of area. Commerce*[1] *(millions of dollars): exports, 555, chiefly (80%) to Great Britain and British possessions; imports, 498, largely textiles and metal manufactures.*

Another reason is the fact that most of the capital invested in Australia is English. Finally, there is the political relation to Great Britain which has caused British goods to be admitted at lower tariff rates than other goods. In this case, trade unmistakably does follow the flag.

[1]Exports and imports are for one year only, as figures for gold during the war period are not available.

314. The Empire of the Rising Sun. Asia (Fig. 201) is larger than North and South America combined, and its population embraces more than half the human race.

Fringing the eastern coast of Asia are many islands, the tips of a growing mountain system, which largely shelter from the Pacific surges a series of inland seas. These islands, from Kamchatka and Sakhalin (latitude 50°) as far south as the Philippines, constitute the Empire of Japan. (Fig. 199.)

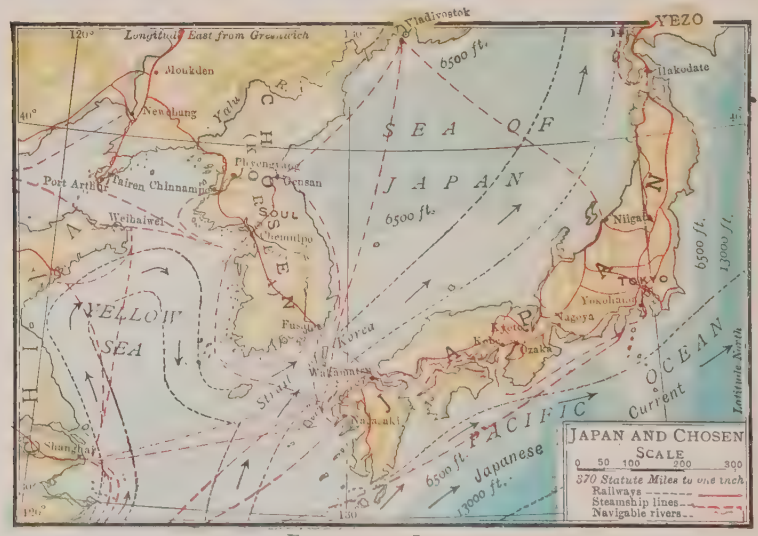
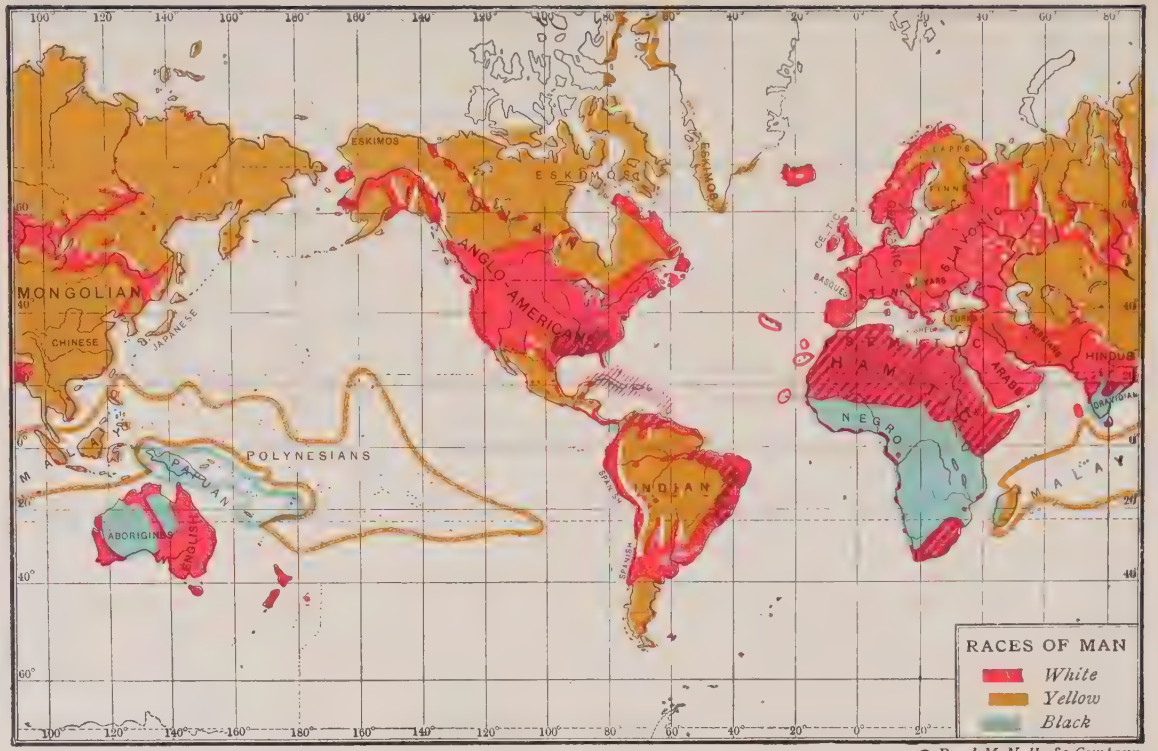


FIG. 199. *Japan.*

By reason of this position with reference to Asia, and despite a great difference in climate, Japan is the Great Britain and the Sea of Japan is the North Sea, of the Far East.

The Japanese, though speaking a Mongolian tongue, differ radically from the Chinese and Koreans, partly because of mixture with some other race, presumably the Malay, and still more because of their insular environment. The sea is a



Data from Bartholomew's Atlas of World's Commerce

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FIG. 200. *Races of man.*

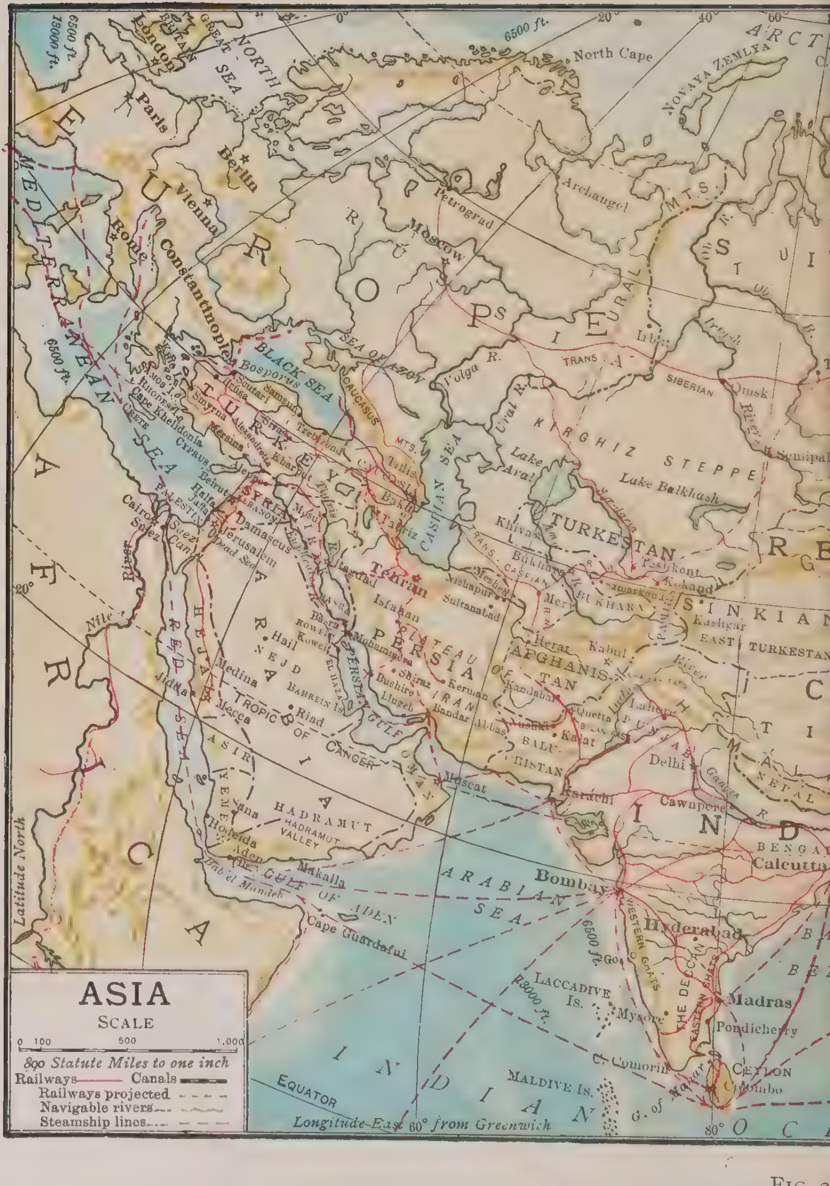
ASIA
SCALE
0 100 500 1,000
890 Statute Miles to one inch
Railways
Canals
Railways projected
Navigable rivers
Steamship lines
GREAT BRITAIN
London
Paris
Berlin
Vienna
Rome
Constantinople
NORTH SEA
North Cape
NOVAYA ZEMLYA
Archangel
Petrograd
Moscow
EUROPE
RUSSIA
URAL MTS.
Volga R.
BLACK SEA
SEA OF AZOV
Bosporus
CAUCASUS MTS.
CASPIAN SEA
MEDITERRANEAN SEA
TURKEY
Smyrna
Scutari
Samsun
Trebizond
Kharput
Mersina
Aleppo
CYPRUS
CRETE
RHODES
Cape Khelidonia
Beirut
Haifa
Jaffa
PALESTINE
Damascus
Jerusalem
Dead Sea
SYRIA
LEBANON
Mosul
Tigris
Euphrates R.
Tiflis
Baku
Tabriz
Tehran
Isfahan
Nishapur
Meshed
Sultanabad
Kerman
PERSIA
IRAN
PLATEAU
Shiraz
Bushire
Lingeh
Bandar Abbas
PERSIAN GULF
Basra
Mohammera
Koweit
Hail
NEJD
ARABIA
Riad
BAHREIN IS.
EL HASA
Medina
Mecca
Jidda
HEJAZ
ASIR
YEMEN
Sana
Hodeida
Aden
Bab el Mandeb
HADRAMUT
HADRAMUT VALLEY
Makalla
GULF OF ADEN
Cape Guardafui
Muscat
OMAN
TROPIC OF CANCER
Cairo
Suez
Suez Can.
Nile
Nile River
RED SEA
AFRICA
Uralsk
Ural R.
Omsk
Irtysh
KIRGHIZ STEPPE
Lake Aral
Lake Balkhash
TRANS SIBERIAN
TRANS-CASPIAN
Khiva
Bukhara
BUKHARA
Merv
Samarkand
Tashkent
Kokand
TURKESTAN
SINKIANG
Kashgar
EAST TURKESTAN
Herat
Kabul
AFGHANISTAN
Kandahar
Quetta
Kalat
BALUCHISTAN
Karachi
Lahore
PUNJAB
Delhi
Ganges R.
Cawnpore
NEPAL
INDIA
BENGAL
Calcutta
Bombay
ARABIAN SEA
Hyderabad
WESTERN GHATS
EASTERN GHATS
THE DECCAN
Goa
LACCADIVE IS.
Mysore
Madras
Pondicherry
C. Comorin
CEYLON
Colombo
G. of Manaar
MALDIVE IS.
INDIAN OCEAN
EQUATOR
Longitude East 60° from Greenwich
Latitude North
6500 ft.
13000 ft.
ARCTIC

FIG. 2

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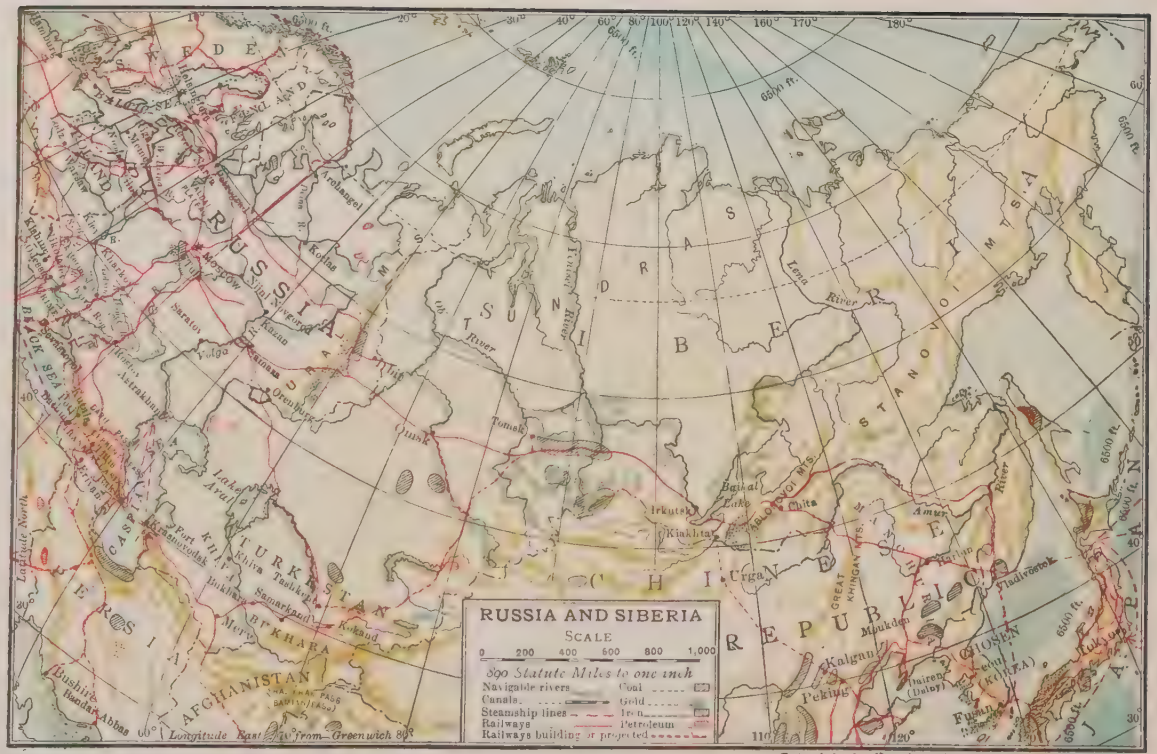

FIG. 202. *Russia and Siberia.*

carrier of new ideas no less than of new commodities. The Japanese thus aspire to become in fact what their position and character tend to make them—the English of the East.

Modern Japan began when Commodore Perry with an American fleet opened the country to commerce (1854). Soon the Mikado,[1] who had been stripped of power by the feudal nobles, regained his authority (1868), induced the feudal lords to resign their prerogatives (1871), and freely opened Japan to modern civilization. To-day Japan, equipped with a powerful army and navy, an elective parliament, efficient public schools, and a ruling class educated in all modern arts and sciences, ranks with the Great Powers of the world, and is a dominating factor in all problems of the Far East. There is no other example in history of such marvelous progress.

315. **Surface and Climate of Japan.** The surface is generally mountainous, and the coast line very broken. As the land is unstable, apparently rising slowly, earthquakes are frequent; and probably for the same reason, volcanoes are numerous.

The main islands correspond in latitude to the Mississippi Valley. The climate is, however, warmer toward the south, on account of the Japan current, than the latitude would indicate; and at the same time colder toward the north, especially in Yezo (Hokkaido), because of a current descending from Bering Strait. Taiwan (Formosa), the southern Ryukyu, and the Bonin islands are tropical. The rainfall is heavy (80 inches), especially on the south coast and in summer when the monsoon wind blows toward the continent (§51).

316. **The Fisheries of Japan.** Nowhere else except in China do fish play so large a part in the life of a great nation. More than 3,000,000 people live by fishing; for all, fish and rice are the staple foods. Fish also serve extensively as a fertilizer.

[1]Descended, according to Japanese accounts, from the oldest royal house in the world, which is reputed to have reigned since 660 B. C.—that is, since three centuries before Alexander the Great.

Japan surpasses even the United States in scientific fish culture. By the treaty with Russia (1905), Japan acquired valuable fishing rights along the Siberian coast, and Japanese salmon canneries are largely supplied from Canadian waters.

317. The Forests of Japan. Forests still cover the upper slopes, cedar serving for shipbuilding, cypress for furniture and ornaments. Yezo has also great oak forests. For most purposes, however, bamboo is employed. (Fig. 203.) Peculiar to eastern Asia are the wax tree, producing an oil used in place of animal fat; the lacquer tree, yielding a fine and very durable varnish; the paper mulberry; and the camphor laurel, which is now found chiefly in Taiwan. Camphor is, next to turpentine, the most important commercially of the essential oils obtained by distillation. It is used mainly in the manufacture of celluloid. The camphor trade is now a government monopoly.

FIG. 203. *Groves of bamboo in Japan.*

318. Agricultural Products of Japan. In Japan, as in south and central China, most farms are under two acres in size, owing to the density of population on the arable lands. The soil is tilled by hand, with rude spades and hoes, but so carefully that the country is a

vast garden. This method of cultivation leaves very little room for live stock. Meat and dairy products are therefore comparatively little used. Until very recently milk, which is now coming into use, was regarded by the Japanese (as cheese still is by the Chinese) with a sort of horror.

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FIG. 204. *Japanese threshing machine in full swing.*

The principal food crop is rice, grown on all lowlands and many of the hillsides, as far as they can be terraced, to latitude 40°. However, the crop is insufficient for domestic use, as the population of Japan exceeds 50,000,000 in a country smaller than California. Moreover, only 15.7 per cent of the soil is arable. Considerable rice is, however, exported, while cheaper grades are imported for domestic use. There is also a limited crop of barley, wheat, and rye, which are not infrequently rotated with rice on the same soil. Grain is usually cut and threshed by hand. (Fig. 204.) Soy beans, being rich in nitrogen, serve as a partial substitute for meat. Plums, persimmons, figs, and oranges are the common fruits.

Raw silk (Fig. 206), largely from the Tokyo district, and tea from southern Japan and Taiwan (Formosa), are the principal agricultural exports. (Fig. 205.) Formosa tea is reckoned the best in the world. Tobacco and hemp are also common crops for local use, and sugar cane is of some importance in Taiwan.

319. Mineral Resources of Japan. Japan has a variety of mineral resources, though the annual output is far inferior in value to the farm products.

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FIG. 205. *Gathering tea near Kyoto, Japan.*

The principal, in fact the only important, export minerals are coal and copper. Coal of fair quality occurs in several fields from southern Sakhalin, but recently recovered from Russia (1905), to Taiwan. Yezo alone is said to contain two-thirds as much coal land as Great Britain. In addition to copper, which was the leading metal of Old Japan, there is now a small output of silver, lead, antimony (used in type metal), and manganese. Iron ore is present but as yet is not extensively mined. Petroleum fields have been opened in the north which partially meet the domestic demand. Sulphur is abundant owing to the numerous volcanoes.

320. Handicrafts of Japan. Hand work reached its greatest development in countries long settled and densely peopled, like Japan, China, and India, where the hard struggle for existence early taught industrious habits. Nowhere did hand work reach greater perfection than in Japan, whose people are distinguished not only for cleanliness, politeness, and courage, but also for an artistic instinct that gives their wares a peculiar grace and beauty.

Among the handicraft products in which Japan excels are fine strong paper used extensively in place of leather, oilcloth, and glass; matting of varied design; porcelain, which was originally a Chinese invention; lacquered and enameled goods; and fine metal work in gold, silver, bronze, and steel. Japanese swords, for example, are reckoned superior to the best from Damascus. These art crafts reach their highest development at Nagoya and the ancient capital, Kyoto.

321. Modern Manufactures of Japan. Japanese matches, made with native sulphur, have supplanted the Swedish product in east Asia. The tobacco industry, a government monopoly, also supports an export trade. Japanese swordsmiths, turning their skill in metals to the arts of peace, now make fine clocks and surgical instruments. The shipbuilding yards at Nagasaki employ both wood and steel; and there are

Courtesy of Rear Admiral H. Webster

FIG. 206. *Reeling silk from cocoons in Japan.*

large iron works at Wakamatsu, belonging to the government. These, however, have often been run at a loss.

The most important modern industry is the manufacture of textiles, especially of cottons, which form an important export. The cotton factories employ mostly women and children, paying them ten to fifteen cents a day. It is this cheap labor that enables Japan to compete with Europe in the markets of China. Hemp spinning and the making of fish nets also occupy several factories, as well as many people in their homes, though less than before the introduction of cotton. Cotton and hemp are combined in Osaka carpets. Silk and even woolen mills are likewise at work, the latter using imported materials.

Modern manufactures center at Osaka, the "Fall River of Japan," with the port of Kobe, both having water power and ready access to coal. Within one hundred miles of Osaka are found a third of the population of the empire and all the large cities except Tokyo and Yokohama. At Osaka is a permanent Commercial Museum of Japanese wares. Osaka, Tokyo, and Kobe also have Commercial High Schools.

322. **Transportation and Trade Centers of Japan.** Human porters and pack horses are the usual modes of conveyance in the country, while jinrikishas drawn by men are used in the cities. The rapid extension of railroads, however, has revolutionized long-distance transportation, making possible an unparalleled expansion of foreign trade. Even Taiwan, recently a tropical wilderness, now has a trunk line of railway traversing the island.

The indented coast line provides many superb harbors. The Japanese are thus naturally a seafaring folk, who are not inaptly called "the Vikings of Asia," and they have served a long apprenticeship as deep-sea fishermen. They aim at nothing less than control of the carrying trade on the Pacific. To that end, the government grants heavy shipping subsidies. Already the Japanese own and officer steamship lines to North and South America, Australia, and all parts of the Orient. They have almost a monopoly in Korean ports, while in Chinese waters they made such progress that they now stand next in tonnage to the English.

Toward America, the principal commercial city is Yokohama, situated a few miles from Tokyo on a large bay where an artificial harbor was necessary, as at Manila. In the north, Hakodate is a coaling and fishing port. Toward China, the chief coaling and naval station is Nagasaki, which has coal on its very shores. Nagasaki is also becoming a transshipment port for Siberia, Chosen, and northern China. Commerce in heavy commodities, however, seeks the port lying farthest inland; hence Kobe, on a splendid landlocked harbor near the head of the great Inland Sea of Japan, commands

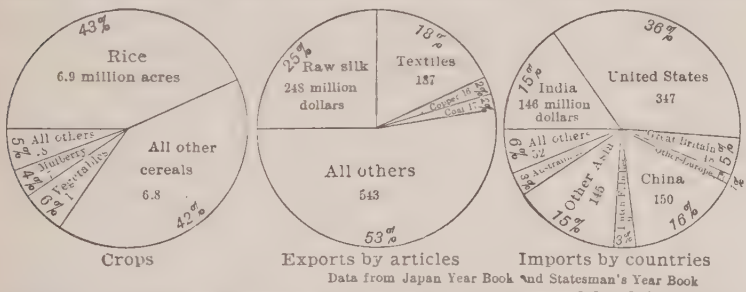


FIG. 207. *Crops and commerce of Japan. The cultivated land in Japan, exclusive of Taiwan and Karafuto (Sakhalin), is 16.2 million acres or 17% of area, the rest being mountainous. Commerce, two-year average (millions of dollars): exports, 1,011, cheifly to U. S. (39%), China (21%), British India; imports, 956, largely raw cotton, worked iron, oil cake, rice, manufactures.*

the bulk of the China trade. It is, in fact, the chief commercial center of Japan. The future of Japan thus unmistakably lies in Asia.

In Taiwan the mountains meet the sea in a series of towering cliffs, and natural harbors are lacking. Kelung, which has a good artificial harbor, is the chief shipping port.

323. The Commerce of Japan. Japan exports largely raw silk, minerals, and teas, besides artistic handiwork; but also more and more factory products, notably cotton and silk goods. On the other hand, Japan imports mainly food and raw materials, especially cotton from India. (Fig. 207.)

The fact is that the overburdened land cannot support the teeming population, which is still increasing at the rate of nearly a half million a year. The Japanese must, therefore, either acquire new lands to cultivate, or new markets for manufactured goods, or they must starve. This grim necessity underlies their rapid development as a manufacturing and commercial nation. It also explains their heroic battle against Russia in Manchuria (1904).

324. **"The Hermit Nation."** The people of Chosen (Korea), finely developed physically, have been known for centuries as the "oxen of the East," submitting without a murmur to every sort of oppression from their rulers; and their government has long been a corrupt and powerless oriental despotism. As a result of the Russo-Japanese War, Chosen (about the size of North and South Carolina and having a population of perhaps ten millions) became a Japanese protectorate and was later formally annexed to Japan. Rich in natural resources and thinly peopled compared to Japan, Chosen is by virtue of its position the natural field for Japanese expansion.

325. **The Products of Chosen.** Corresponding in latitude to the Atlantic coast from Boston to Charleston, S. C., Chosen has a temperate climate and fertile soil, though the surface is somewhat mountainous. The uplands bear valuable forests both of pine and hard woods, especially along the Yalu River; and the forests abound in fur-bearing animals such as the Korean tiger, fox, and squirrel. In the main, however, Chosen is an agricultural country. In the broad valleys the usual temperate crops are grown; toward the south also rice, cotton, beans, and tobacco. Rice alone amounts to nearly half the exports. Another crop is ginseng, a worthless root much prized by the Chinese as a cure-all. Live stock and animal products are also of some importance.

The mountains are rich in minerals, including copper, coal, and iron. Only gold, however, is extensively mined, chiefly by Americans. The sole manufactures for the market are paper and straw hats, both made by hand.

326. Trade Routes of Chosen. The east coast rises steeply from the sea in forest-covered mountains. There is, however, one spacious bay on which Wönsan (Gensan), the port of an important mineral district, is located. The western slope, on the other hand, is gradual, and five of the rivers are navigable in their lower reaches. For land transportation crude carts and sleds are used. (Fig. 208.) The principal commercial port[1]

FIG. 208. *Korean oxen and sleds.*

on this coast, and indeed in all Chosen, is Chemulpho, which has both river and rail connection with the capital. This railway crosses the peninsula to Wönsan. In the south the principal port is Fusan, situated on a deep bay where the Korean Strait is narrowest (120 miles). Ferryboats from Japan there connect with the trunk railway, which traverses Chosen and Manchuria, bringing Tokyo within twelve days of Paris by rail.

[1]Another, having a much better harbor, is Chinnampo, the port of the Phyöngyang district.

XXIII—THE CHINESE REPUBLIC

327. "A Cycle of Cathay." China is the oldest nation in the world. Rome seems ancient to-day; but when Rome was still a place without a name, China already looked back on more centuries than have since elapsed.

Measured by all material standards, moreover, the Chinese Republic is most impressive. It is a third larger than the United States. Its population, in round numbers 400,000,000, is more than a fourth of the human race. Finally the Chinese thrive in conditions where no other race could exist, and surpass all nations in patient endurance of labor.

But before the shock of arms, the colossus crumbles. Ancient renown, numbers, wealth, and industry are alike powerless to save a nation from that searching and remorseless test of efficiency. The difficulty seems to be that China acquired her national characteristics in the many ages during which she was effectually isolated by seas, mountains, and deserts, forming a world in herself. As a result, China is like a house built of bricks without mortar. Her people, though rating life of little worth, are not brave in battle, and the family tie is so strong among them that public spirit or national patriotism can hardly be said to exist. China thus appears badly equipped for the modern struggle for existence of nations. After the overthrow of the alien Manchu dynasty by men educated abroad, a nominal "republic" was indeed set up, but this quickly fell under the absolute rule of the first president and then under a virtual Japanese protectorate (1915).

328. Physical Features. The Chinese Republic extends from the latitude of Jamaica to that of Labrador, and has a corresponding variety of climate. (Fig. 209.)

Eastern China consists in the main of three great river valleys, while between them the mountain ranges spread out

like a fan toward the east, thus admitting the rain-bearing monsoon winds of summer to the interior (§51).

Central Asia, however, is an enormous plateau, arid because far from the sea and shut off from it by mountains. Tibet, inclosed between the Himálayas and parallel ranges, resembles the Andean plateaus, but is even loftier. Mongolia and East Turkestan, on the other hand, are comparatively low (2,000–3,000 feet) and slope toward the center, being no doubt

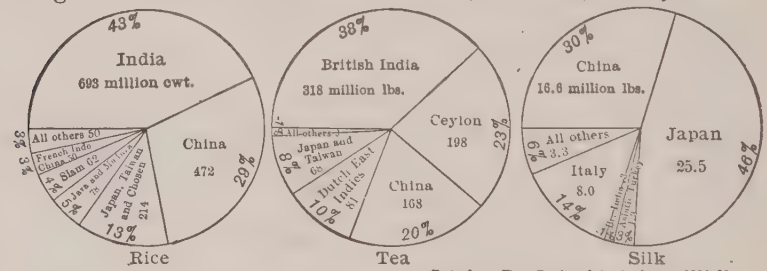
FIG. 209. China.

the bed of an ancient sea. In this region crops can be grown only on irrigated lands near the foot of the mountains.

The fertile yellow loess of the upper Hwang Ho, brought by the westerly winds of winter from central Asia, and the rich volcanic soil of the upper Yangtse Kiang, are cultivated as high as 8,000 feet. The lower river valleys are even more fertile; but they are largely below the river level and subject

to disastrous floods despite, or rather because of, the system of dikes; for the sediment, being deposited only in the river bed, finally raises the river bodily above the surrounding country. It is this process of putting the river on stilts that has made the Hwang Ho[1] "China's Sorrow."

329. Chinese Fisheries and Forests. In China, as in Japan, fish and rice are jointly the staff of life. Forty millions are believed to live in large part by fishing, plying their trade by day and night with seines, lines, cormorants, and every imaginable device. The trade in fish is, however, mostly local.



Data from Year Books of Agriculture, 1913-20

FIG. 210. *Commercial staples of eastern Asia. Totals, five-year average: rice, 1,619 million hundred weight; tea (export), 836 million pounds; raw silk, 55.5 million pounds.*

The forests have been almost entirely cut away, with disastrous results to soil and water ways, except in Manchuria, where there are both pine and hard woods. The Yalu River brings down some logs to sawmills near the sea. The common people use the bamboo for almost every conceivable purpose. "China wax" is a substance of some commercial value for candles, deposited by an insect on a species of oak in southern China. Wood oil, obtained from nuts, is used in varnish.

330. Chinese Agriculture. It was fitting that the Emperor of China should open every planting season by himself plowing

[1]The Hwang Ho has changed its course no less than eleven times in twenty-five centuries, the last time (1852) moving its mouth over 300 miles. A minor outbreak (1887) drowned at least a million people. The same system of dikes or levees is in operation on the lower Mississippi and bids fair in time to have the same results. In Egypt, on the other hand, the floods are allowed to overspread and fertilize the land.

a furrow, for most of the people dwell in villages and live from the soil. The list of great cities is indeed imposing; but the proportion of urban population is, after all, trifling.

From the Yangtse Valley south, rice is by far the most important food crop; though other cereals and beans are sometimes grown in winter. (Fig. 210.) Southern fruits abound, particularly oranges. Sugar cane and cassia, a kind of cinnamon, are at home in the Si Kiang Valley. Ramie, hemp, and in recent years cotton, are planted in small patches to be spun and woven by the women. Cotton is also exported to some extent, principally to Japan. Ramie or China grass is preëminent for luster, fineness, and strength, but the extraction of the fiber is difficult and therefore expensive.

FIG. 211. *Coolies in a treadmill pumping water for flooding rice fields.*

In the southern uplands, much land was planted in tobacco and in opium poppies,[1] so much, indeed, that foodstuffs had to be imported. The principal hill products are, however, silk and tea, which originally opened China to foreign commerce.

[1]The Chinese government has, however, endeavored (since 1911), with more success than any one expected, to check the cultivation of poppies, in order to get rid of opium smoking which had become a national danger.

Since the earliest days China has been preëminently the Land of Silk. In recent years the tea crop has declined in consequence of export duties and the competition of the machine-cured tea of Ceylon. In general, the hot, wet summers enable southern crops to be grown far beyond their usual limits, rice and cotton, for example, almost to the latitude of Chicago.

In northern China and Manchuria, the usual crops are beans and cereals, especially wheat and millet. Niuchwang (Newchwang) is the greatest bean market in the world. Manchuria and Mongolia east of the Khingan Range probably rival the United States in amount of land adapted to spring wheat.

FIG. 212. *Plowing by man power in China.*

Much of this is still under grass, being held by Manchu chiefs who pasture vast herds upon it: but Harbin, on the navigable Sungari where the railway forks to Vladivostok and Port Arthur, is already a great milling center. Modern flour mills have also been established as far south as Shanghai.

China proper is so frightfully overcrowded with people trying to live by agriculture (Figs. 211 and 212) that domestic animals are scarce, except poultry and hogs. Moreover, Buddhism discourages the eating of meat; though this does not prevent it in Tibet and Mongolia, where lack of water severely limits crop growing. Dairy products are consequently of little importance, though eggs are abundant and cheap, being

largely exported. Vegetable oils are commonly used in place of butter. The chief sources of table oils are sesame, a plant much cultivated by the ancient Babylonians, and (strange as it may seem to those who remember youthful experiences) the castor plant. In the north, soy beans are also pressed for oil, the bean cake afterward serving as a fertilizer.

In central Asia, unlike China proper, there are many sheep and goats, besides some horses and camels, though few cattle. The exports are chiefly wool and skins. In Tibet the yak is important as a burden bearer; and a species of deer is found which yields musk, well known as a perfume.

331. Mineral Resources of the Chinese Republic. Chinese civilization is based on the soil, European civilization on the under-earth. Mining has been almost impossible in China lest, as the people ignorantly feared, the "earth-devils" be let loose. Yet China is rich in many, and enormously rich in a few minerals.

The plateau of Yünnan in the southwest contains copper, silver, lead, tin, gold, antimony, and vast sulphur beds. The same minerals exist in the Shantung (eastern) and Shansi (western) mountains; but the special wealth of these districts is in coal and iron. Shansi alone contains, according to some reports, twenty times as much anthracite coal land as the United States. Coal underlies, in whole or in part, a number of the other provinces of China, besides Manchuria. Although the latest investigation[1] has much reduced the previous estimates of the Chinese coal reserves, it still appears that China has great coal fields, some of them near large deposits of iron ore.

332. Chinese Manufactures. Until recent years, Chinese manufactures were household or at most neighborhood industries. Deserving of mention, besides the textiles woven in the homes of the people, are the copper and bronze goods of Yunnanfu; the porcelain of Kingtechin; the "India" ink of Nanking; the carving in jade, ivory, and wood of Canton;

[1] Bailey Willis, *Mineral Resources of China* (Economic Geology, 1908).

the paper, straw, matting, and bamboo goods, fans, and fireworks of innumerable cities. The best Chinese wares, though possibly less artistic, are often more solid and durable than the Japanese.

The introduction of modern machinery in such a densely-peopled country throws millions out of the employments which they and their fathers have followed for many generations. Nevertheless, power machinery has been introduced in the cotton and other mills at Shanghai and vicinity and in the iron industry near Hankow, where coal and iron lie close together. Machinery is also slowly making its way into other industries.

Not a few observers, beholding the numbers and endurance of the Chinese, are haunted by the specter of the "yellow terror," fearing that they will possess by industry, and perhaps eventually by arms, the greater part of the world. But an unmilitary people cannot become military by learning the manual of arms; nor can the Chinese adopt modern machinery yet permanently keep their present low standard of living, which now enables Chinese cheap labor to defy competition.

333. Transportation in China. Transportation is chiefly by water, for which the great rivers, except the sandy Hwang Ho,

FIG. 213. *Coolies with loads and resting sticks.*

afford excellent facilities. Canals are also numerous. The Grand Canal, built in the seventh century and restored by

Courtesy Popular Mechanics

FIG. 214. *Chinamen bringing goods to market on sailing wheelbarrows.*

Kublai Khan (1289), connects the Yangtse Kiang with the Pei Ho at Tientsin-fu (700 miles). It served originally to carry the rice tribute of the southern provinces to Peking, but it is now almost useless in its northern half and cannot compete either with railways or with steam transportation by sea.

On land, porters, wheelbarrows, and sedan chairs are used (Figs. 213 and 214); but animal power is employed in Manchuria and northern China, where the cold winters render the country passable for carts. The caravan trade across Mongolia is by camels, though recently an automobile line has been established. Owing to the fact that ocean carriage injures tea, much of the tea for Europe is still conveyed by land.

The first locomotives in China were worshiped as dragons; the first railway (1876) was bought up by the authorities and destroyed. But all that is changed. The Chinese government, indeed, for a time went to the other extreme, granting to the Russians in Manchuria, the Germans in Shantung, the French in Yünnan, and other nations elsewhere, exclusive railway and mining rights that endanger the very integrity

and independence of the Chinese Republic. Realizing this danger, the government has now adopted the policy of building railways itself with Chinese capital.

The principal railways already open are: (1) the extensions of the Siberian line across Manchuria to Vladivostok and Port Arthur; (2) the line connecting this Manchurian system with the Chosen railway and with Tientsin-fu, completing the all-rail route from Paris to Peking; (3) the Peking-Hankow line (755 miles) which will be extended to Canton, forming the great north and south trunk road; (4) another trunk line from Tientsin-fu to Nanking, paralleling the Grand Canal; (5) the Peking-Kalgan line, which will be continued to Urga, along the ancient caravan trail.

334. Centers of Commerce in the Chinese Republic. In the absence of railways, the location of commercial centers was determined, until recent years, exclusively by the water ways and caravan routes; consequently only the river ports are of first-class importance.

Canton, a leading seaport and formerly (until 1842) the only open port, is still the chief silk market. The three rivers which lead into the interior from Canton carry a heavy traffic and open paths for future railways. Some miles below the city, however, a bar with only sixteen feet of water over it shuts out large sea-going vessels.

From Canton to the Yangtse Kiang the harbors are good but not commercially important. Swatow, Amoy, and Foochow, indeed, do a respectable business, but they are cut off from the interior by mountains nearly parallel to the coast. This section is largely under Japanese influence from the near-by island of Taiwan, long known as Formosa.

The Yangtse Kiang Valley is the heart of China; Shanghai near the mouth of the Yangtse Kiang, is the New York of China. (Fig. 215.) Even goods destined for northern ports, like most of the American exports, are trans-shipped at Shanghai. It has, however, rather shallow water (twenty feet), being situated some fourteen miles up a tributary of the

Yangtse Kiang where the banks are less swampy. The out-port of Wusung is therefore growing rapidly. Another important Yangtse Kiang port is Hankow,[1] 680 miles from the sea but accessible to seagoing vessels, and situated at the focus of tributary water ways. It is the greatest tea market and the largest city of China.

In the north commerce centers about the Gulf of Chihli, though only the Shantung and Liautung peninsulas contain good harbors. Tientsin-fu is the river port of Peking, the second city in China. By virtue of its position near the head

FIG. 215 *Native part of the water front at Shanghai.*

of the Gulf of Chihli, Tientsin-fu has become a center of commerce second only to Shanghai, notwithstanding there is a thirteen-foot bar at the river mouth. Peking commands the rail and caravan routes through Mongolia to Siberia and Europe by way of the Nankou pass,[2] Kalgan, and Urga; and also the route into Manchuria between the Great Wall and the sea at

[1]Other Yangtse Kiang ports are Chinkiang, at the entrance of the Grand Canal; Ichang, 1,050 miles inland at the head of navigation for large, and Chungking (1,500 miles) for small steamers. Junk traffic goes still higher up the river.

[2]A narrow defile barred with huge gates and rising from 4,000 feet at Nankou to 5,000 at Kalgan.

Ninghai, now traversed by a railway. Harbin is a new railway center in Manchuria. Newchwang[1] on the navigable Liau Ho (19 feet) is the native port of Manchuria; though foreign commerce has increasingly shifted to the ice-free port of Dairen (Dalny), built by the Russians and now held by the Japanese. In like manner Chefoo, a native port in Shantung Peninsula, has been largely superseded by the port of Tsingtao, built by the Germans and connected by rail with the interior.

335. **Merchant Guilds of China.** Trade in China is controlled by powerful merchant guilds. These enforce so rigid an observance of contracts by members that a Chinese merchant's word is as good as his bond. Such a reputation is one of the principal assets of Chinese merchants in the Far East. This condition is the exact opposite of that which obtains in Japan, where public officials are usually honest but the merchants are often unreliable.

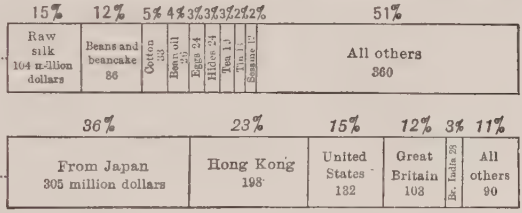
On the other hand, the Chinese merchant guilds mercilessly pursue and boycott non-members. No foreign house, therefore, can hope to establish itself until it has made its peace with the native guilds. This means the employment of Chinese as compradors or native managers; and while they live up to the letter of their contracts, they one and all pocket a percentage—known throughout the Orient as a "squeeze"—on all the business they transact. In many cases, the comprador has come to be the real owner of the business and tolerates the presence of the nominal foreign owners merely to secure the protection of foreign consular courts against the blackmailing exactions of the native courts.

336. **The Commerce of China.** The principal exports of China are silk, tea, cotton, and other raw materials; while the imports are largely cotton manufactures, opium, kerosene, and foodstuffs, especially sugar, rice, and fish. (Fig. 216.)

[1]Some thirteen miles up the Liau Ho. It is also called Yingtse and Yinkow. There is another Newchwang, thirty miles up the river, of little importance.

The bulk of the commerce is still with Great Britain and British possessions; though before the World War many, if not a majority, of the mercantile houses were German, and the German Asiatic Bank of Shanghai, with branches in other Asiatic cities, had great commercial power.

American interests in the Far East began when the good ship "Empress" first carried the American flag to China (1784); but their development has been hindered by the same causes as in South America (§300). The Chinese Republic, rich by nature and densely peopled, is the greatest potential market in the world; and the United States, fronting it across the Pacific,



U. S. Commerce Reports, 1920-21

FIG. 216. *Commerce of China. Totals, three-year averages (millions of dollars): exports, 701, mostly to Hong Kong (25%), Japan (26%), United States, Great Britain, and France; imports 856, the largest items being cotton goods, sugar, tobacco products, rice, fish, metals, minerals, machinery, and kerosene. The imports from Hong Kong are chiefly of British origin.*

is nearer by sea, and for this reason has a more vital interest there, than any nation of Europe. China is, moreover, the greatest consumer of cotton goods, while the United States is the greatest producer of cotton. The prosperity of the United States in the future thus largely hinges on the maintenance in China of the "open door"—that is, a fair field and no favors, alike for all competing nations—and on the ability of American merchants to hold their own in international competition.

337. Foreign Possessions in China. The island of Macao at the mouth of Canton River was early granted to the Portuguese (1586). Having a harbor too shallow for modern vessels, the city is now greatly decayed. It once had the

opium trade by way of the Si-Kiang River from the poppy region of Yünnan. It is also the gambling den of Asia.

Hong-Kong, an island near Canton, was ceded much later (1842) to the English, who also acquired (1898) a lease of the adjoining peninsula. At Hong-Kong is a splendid harbor where English administration has created from nothing in half a century the greatest commercial port in Asia, and one of the greatest in the world. (Fig. 217.) It is an absolutely

Courtesy of Jerrems' Sons

FIG. 217. *Hong-Kong Harbor.*

free port, without a custom house. Through it passes most of the commerce of southern China, Indo-China, and the Philippines. (Fig. 291.)

After the Chino-Japanese War, Germany suddenly landed sailors and seized (1897) Kiaochow Bay, alleging as a reason the murder of two German missionaries. A lease for ninety-nine years was subsequently obtained of a small district (208.4 square miles) around the bay, together with exclusive railway and mining rights in the huge province of Shantung. The harbor (Tsingtao or Chingtao) is deep, landlocked, always ice-free and now connected by rail (279.6 miles) with the city of Tsinan on the Hwang Ho. Tsingtao thus has decisive advantages over Chefoo, and indeed over all northern ports. It lies, moreover, on the steamer track to the Gulf of Chihi or Chosen. In November, 1914, the Japanese laid siege to the city and forced its surrender, retaining control of the region. One of the principal native manufactures at Tsingtau is that of straw-braid wares.

At the close of the Chino-Japanese War (1895), Russia in conjunction with France and Germany expelled Japan from Port Arthur in order to "preserve the integrity of China." Russia then proceeded to obtain possession herself of Port Arthur and, in effect, of all Manchuria. The Japanese subsequently recovered Port Arthur by force of arms (1905), while by the terms of peace Manchuria was to be restored to China. Manchuria was, however, practically divided between Japan and Russia, the latter retaining the lion's share. With the breaking up of the Russian Empire, Japan's hold has been strengthened.

In Kashgar, moreover, the Russian consul with his guard of Cossacks was the real power;[1] and in Mongolia Russia held a mining monopoly, a franchise for a railway from Kiakhta to Urga, and had opened at Urga, the capital of Mongolia, a branch of the Russo-Chinese Bank guarded by Cossacks, with Russian forts and barracks. Such conditions were the usual forerunners of annexation. However, with the overthrow of the Romanoffs and the spread of Bolshevism, Mongolia was left with little protection and appealed to China. In 1921 the independence of the country was proclaimed and a kingdom was established. Of late years there has been a great extension of Chinese immigration.

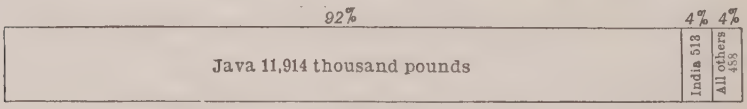
In order to offset Port Arthur and Kiaochow, England secured a lease (1898) of Weihaiwei, a naval station in Shantung Peninsula. France at the same time obtained a lease of Kwangchowwan Bay in the south, and a cession of two islands commanding the harbor.

The division of China thus appeared to be well under way; but it was checked and may in the end be prevented by the open-door policy of the United States. Japan, however, aspires not only to be the schoolmaster of Asia, but also to control its commerce.

[1]American Geographical Society *Bulletin*, Dec. 1905, p. 705.

338. Malaysia. The East India islands, between New Guinea and the mainland of Asia, are equal in extent to Europe outside of Russia, and support a population of many millions. All this mighty colonial domain, except the Portuguese end of Timor, the British part of Borneo, and the Philippines, belongs to Holland. The inhabitants are Malays, possibly a cross between Hindus and Mongolians, who mostly became Mohammedans after the Arab conquest (1478). Malaysia includes also the Malay Peninsula, of which the larger part is British. The soil is in large part of volcanic origin, abundantly watered and fertile.

339. Agricultural Products of Malaysia. Java, containing fully three-fourths of the population of the Dutch East Indies, is perhaps most widely known for its coffee. This is grown at medium elevations (2,000–5,000 feet). In recent years, however, coffee has lost ground in favor of tea and cinchona (Fig. 218), both grown at higher levels. Java also ranks high in



Data from U. S. Commerce Reports

FIG. 218. *World's production of cinchona bark. Total, 12,915 thousand pounds.*

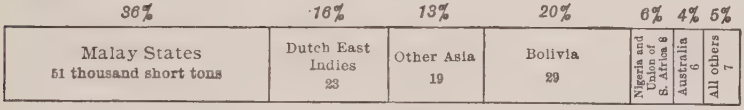
cane sugar (Fig. 278) and next to Bengal as a source of indigo, both being lowland crops. Sumatra is especially noted for tobacco and pepper. The Moluccas are still, as they were when Columbus set sail in search of them, and chanced upon America, the spice islands; though the spice trade has relatively declined in modern times, owing to the use of fresh meat and green vegetables.

In addition, many of the islands, as well as the Malay

Peninsula, export sago, tapioca, and copra. In recent years rubber plantations, mainly of Pará trees, have also become important. Buffalo, goat, and cattle hides are largely exported.

340. Other Products of Malaysia. Most of the land, even in Java, is still forested, and jungle products are of great value. These include dammar and copal resin, used in varnishes; benzoin, a resin burned as incense; gutta-percha, rattan, tree cotton (*kapok*), a tanning extract called gambier, and the "edible birds' nests" of Borneo.

The sea yields pearls, tortoise shell, and trepang. The mineral resources comprise petroleum and coal, especially in Sumatra and Borneo; also the principal tin deposits in the world, extending through the Malay Peninsula, Banka, and Billiton. (Fig. 219.) Sumatra oil has become an article of



Data from Mineral Resources of U. S., 1918-19

FIG. 219. *World's production of tin. Total, five-year average, 143 thousand short tons.*

export. Owing to the neighboring tin deposits, Singapore has the largest tin smelters in the world, and many canneries, especially of pineapples.

341. The Commerce of Malaysia. Mining and commerce are mostly carried on by Chinese, who are crowding out the less energetic natives, especially in the British possessions, where many natives of Southern India also settle.

Java is traversed by a trunk line railway, with various branches. There are also short lines in Sumatra and a trunk line in the Malay Peninsula.

The metropolis of the Dutch East Indies is Surabaya, on a fine harbor in eastern Java. The capital, Batavia, adjacent to a new artificial port (Tanjong Priok), is also an important commercial city. Singapore, a British possession, with a harbor of ample depth commanding the gateway connecting the Indian and Pacific oceans, is regularly visited by some

fifty lines of steamships. Like Hong-Kong, it is an absolutely free port, without a custom house; and it is the greatest coaling and transhipment port in the Far East.

As the exports are mainly raw materials and condiments, the imports are naturally manufactures and foodstuffs. The share of the United States in the commerce of the East Indies, both Dutch and English, is insignificant and, aside, from the petroleum trade, it consists chiefly of American purchases.

342. Indo-China. Indo-China is aptly named, the people being of Mongolian origin, while their religion (Buddhism) and civilization came from India. Only Siam remains for the present independent, serving as a buffer state between French Indo-China[1] and Burma, the latter now a part of British India.

Siam and French Indo-China are largely rugged and forest-clad, impenetrable except along the water ways. The population is therefore mainly settled in the lower river valleys, where the soil is exuberantly fertile, but the damp tropical climate "repays careful avoidance" by Europeans.

343. Products and Commerce of Indo-China. By far the most important commercial crop is rice, grown on the deltas of the great rivers. (Fig. 220.) Other plantation products are

42%	18%	15%	9%	16%
India 5,477 million lbs.	French Indo-China 2,421	Siam 1,990	Malay Pen. 1,118	All others 2,052

Data from Year Books of Agriculture, 1912-20

FIG. 220. *Sources of rice exports. Total, five-year average (millions of pounds), 13,058.*

pepper from Siam, and tea from French Indo-China. One of the leading exports is teak timber, which is proof against the attacks of ants and marine worms. Minerals of many kinds abound, but few are worked, except coal along the Songkoi River, and tin, which is found in considerable quantities. There are, moreover, a number of rice and lumber mills.

[1]Comprising Cochin-China, acquired 1859; Cambodia, 1863; Tong-king, 1873; Annam, 1883; Laos, 1893.

Transportation depends in general on the rivers,[1] though several short railways are open and others are projected. The most important line follows the Songkoi to the Chinese fron-frontier and now extends to Yunnanfu. This is part of a French plan for the commercial conquest of southern China.

The chief commercial centers are Haiphong on the Songkoi River; Saigon on deep water connecting with the Mekong in the French possessions; and Bangkok on the Menam, in which is largely under British influence. Hanoi, the capital of French Indo-China, is accessible to large river steamers.

344. India and Ceylon. India is, like China, a world in itself, containing more people than North and South America, Australia, and all the islands of the Pacific. Yet India has no unity except that imposed by British rule. It is, in fact, a museum of races, languages, and religions.[2] Religious wars have filled India like Java with splendid and melancholy ruins of past greatness; and to-day the strong hand of Great Britain with difficulty restrains the mutual hatred of Brahmins and Mohammedans, which frequently breaks out in massacres of one another. Should England retire, therefore, some other strong power would promptly step into her place.

A fourth of India is still ruled by several hundred native chiefs who swear allegiance to the King of England—who is also Emperor of India—much as feudal vassals were wont to do in the Middle Ages.

In addition to the feudatory states, Nepál, Bhután, and Balúchistán are British protectorates attached to India. Tibet, nominally Chinese, is virtually a British sphere of influence. Ceylon, on the other hand, is a British colony independent of India.

[1]The Songkoi is navigable beyond the Chinese frontier; the Mekong to Khong, where a railway goes past the rapids; and the Menam to the main forks. The lowlands are also traversed by a network of canals. These largely take the place of streets in Bangkok, the "Venice of the East."

[2]Embracing the black, white, and yellow races; upwards of a hundred native tongues, and six religions besides Christianity, that count their adherents by millions. The most numerous are the worshipers of Brahma, over 200,000,000; the Mohammedans, over 60,000,000; and the Buddhists, over 10,000,000.

345. Surface and Climate of India and Ceylon. India bears some resemblance to Italy, having a great plain in the north and a mountainous peninsula toward the south. Ceylon, moreover, corresponds in position to Sicily, but contains a core of very lofty mountains.

The temperature varies with the elevation, from the deadly tropical swamps of the Ganges-Brahmaputra delta to the Himálayas (Abode of Snow).

The moisture is governed by the winds. In winter during the northeast trade, some rain falls on the east coast from

Courtesy of the Forest Service

FIG. 221 *Elephants hauling teak logs in Burma.*

Madras south; but the very life of India depends upon the southwest monsoon, generated by the heat of the continent in summer. The rainfall is heaviest in the east, uncertain in the center, and least in the Indus region, on account of Africa and Arabia, which by their intense heat in summer break the force of the monsoon blowing toward India. Irrigation is extensively practiced, especially in the west and northwest.

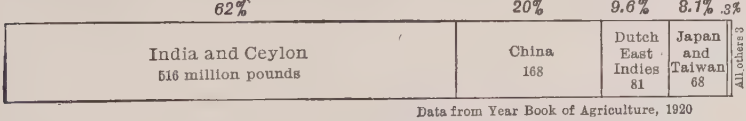
346. Animal Products of India and Ceylon. Pearls are found in the shallow waters near Ceylon. Domestic animals are very numerous, including buffaloes for plowing and elephants for work in the jungles (Fig. 221); but all the native

religions except Mohammedanism taboo the eating of meat. Stock-raising for the market is therefore a separate business only in the dry Mohammedan west. Hides and wool, however, figure among the exports.

347. Forests of India and Ceylon. Valuable timber is plentiful only in a few districts, teak (Fig. 221) chiefly in Burma, deodar (a giant cedar) on the Himálayan foothills, and in the lee of the western Gháts, where also are found sal for building and sandalwood for furniture. The omnipresent bamboo serves all purposes among the natives. The forests also yield many tanning substances, the most important being cutch (*catechu*) and myrobalans, besides wild silk and gum-lac, a substance deposited on trees by insects. From this substance shellac, used in sealing wax, also as a dye and in finishing woodwork, is derived.

348. Cultivated Products of India and Ceylon. Tropical fruits are of prime importance in the daily life of the people. The coconut on the coasts and islands,[1] the date palm in the dry west, furnish both food and fibers. Ceylon also exports large quantities of coconuts, copra, cocoa oil, and coir, the fibrous husk of the coconut. The mango and the plantain (banana) are the main support of the peasants in many districts between harvests. The cereals for local use are rice in Burma and the moist east; millet in the dry west.

India leads the world in the production of jute, of which it has a virtual monopoly, indigo, and oil seeds—chiefly linseed, rape, sesame, and castor beans. India also leads in the



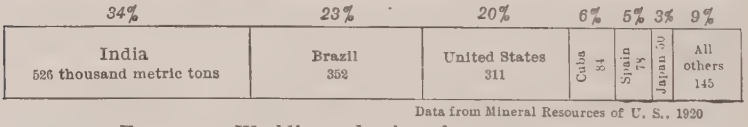
Data from Year Book of Agriculture, 1920

FIG. 222. *Sources of tea exports. Total, five-year average (millions of lbs.) 836.*

export of tea (Fig. 222), grown on the uplands of Ceylon and the Himálayas, and ranks next to the United States

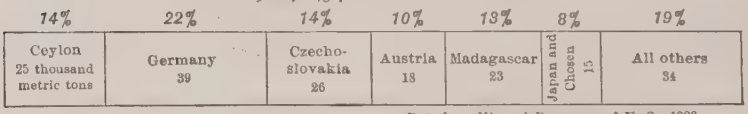
[1]Ceylon has twice as much land in coconuts as in tea. Coconuts are also the chief product of the Andaman, Nicobar, Laccadive, and Maldive islands, all attached to the government of India.

in cotton. (Fig. 84.) Rubber culture has also taken root in Ceylon as in Malaysia on the lowlands. Since the Russo-Japanese war, which raised the price of camphor, plantations of the camphor laurel have been established in Ceylon, frequently interplanted with tea. There is, in addition, a considerable export of wheat, here a winter crop, from the western provinces. (Fig. 43.) In the extreme south some coffee is grown, together with spices—cinnamon, pepper, ginger, and nutmegs. The growing of poppies for the manufacture of opium was a leading industry, until the government



Data from Mineral Resources of U. S., 1920

FIG. 223. *World's production of manganese ore. Total in 1918, 1,546 thousand metric tons.*



Data from Mineral Resources of U. S., 1920

FIG. 224. *World's production of graphite. Total, four-year average, 180 thousand metric tons; value in 1917, 12, 138 thousand dollars.*

of China, where most of the drug was marketed, took a strong stand against the opium traffic.

349. Mineral Products in India and Ceylon. India is not, on the whole, rich in minerals. It is, however, an important producer of manganese and mica. Since the Russo-Japanese War, indeed, India bids fair to become the principal source of manganese. (Fig. 223.) Gold is also mined near Mysore, the works being run by electricity. Burma is the chief source of rubies, now more costly than diamonds, and of jade, a stone greatly prized by the Chinese. Ceylon is an important source of the world's graphite. (Fig. 224.) Mineral fuels are also present, petroleum being obtained in Burma and piped to Rangoon, while coal is mined near Calcutta. The coal fields are large but most of the coal is of poor quality and not adjacent to iron or limestone.

350. Manufactures of India and Ceylon. The traditional manufactures are hand-made textiles such as cashmere shawls, and handicraft work in metal, ivory, and leather.

51%	19%	9%	6%	5%	10%
India 4.2 million bales	Great Britain 1.6	Germany .7	U.S. .5	France .4	All others .8

Data furnished by Bureau of Statistics, Dept. of Agriculture

FIG. 225. *Jute manufacture, as shown by consumption of raw material. Total, latest available figures, 8,235,726 bales of 400 pounds, all grown in India.*

Power machinery has now been introduced for cotton at Bombay, jute and paper at Calcutta, leather at Cawnpore, and iron in Bengal. In fact India, having the raw material at hand and cheap labor, leads in jute manufacture. (Fig. 225.) There is also some export trade in cotton and jute goods, especially of coarse cottons to China. (Fig. 226.) As yet, however, India is almost exclusively agricultural, nearly all the people (95 per cent) living in small farming villages.

351. Commerce of India and Ceylon. Water ways are fairly abundant. "Mother Ganges" is the great highway of Central India, being easily navigable to Cawnpore. The Brahmaputra is used to Assam; the Irrawaddy to Bhamo (800 miles), though large river boats stop at Mandalay. The Indus, however, is so shifting that steamer traffic has ceased, and the Deccan rivers are broken by numerous rapids.

Land transportation has been revolutionized since the Mutiny (1857), in part for military reasons. There is now a network of excellent wagon roads and of railways, the latter embracing two-thirds of the railway mileage in Asia. From the railway termini caravan routes reach Persia, Afghanistan, southwestern China, and also the broad mountain valleys of Tibet, since the Lhasa expedition (1904) opened that country to commerce.

The coast is deficient in harbors. Calcutta, the metropolis, is a river port constantly endangered by the Ganges; Madras, the third city in size, and Colombo at the crossroads of the

Indian Ocean, have artificial harbors. The best harbor is that of Bombay, the second city, which is sheltered by islands. Owing to its position, it has profited greatly from the Suez Canal. Karachi, a new port near the Indus, is the outlet of the Punjab, as Rangoon on the Irrawaddy is of Burma.

Portugal holds Goa and other stations on the west, France has Pondicherry and other towns chiefly on the east coast—melancholy relics of Indian empires that have passed away.

352. The Plateau of Iran. From the Indus to the Tigris and northward to the Caspian stretches a great plateau, rimmed with mountains, and mostly arid because not exposed to the full force of the southwest monsoon. This plateau contains Afghanistan, Baluchistan, and Persia. The Persians are in

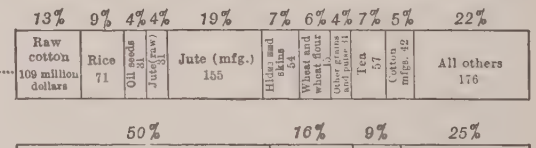


FIG. 226. *Commerce of India. Totals, three-year averages (millions of dollars): exports, 805, largely to Great Britain (31%), United States, and Japan; imports, 518, the largest items being cotton goods, sugar, iron and steel, machinery and other manufactures.*

part of Aryan descent, but most of the inhabitants of the Iranian Plateau are related to the Turks; and all are fiercely Mohammedan. In Persia, however (shades of Darius and Xerxes!), a parliament was established (1906) in imitation of Japan. The Shah, indeed, soon proceeded to cannonade the parliament, but lost his throne in consequence. After a few years, however, the council ceased to exist and the Shah now rules in conjunction with a cabinet.

353. Products of the Iranian Plateau. Though so unpromising to the eye, most of the plateau furnishes pasturage for camels, sheep, and goats. The pastoral exports comprise wool, hides, and lamb skins, the last named valued as furs.

Moreover, the irrigated districts in the valleys and along the foot of the mountains are highly productive, like the lovely vale of Shiraz, renowned in Persian poetry for roses and wine and nightingales. The agricultural exports embrace dried fruits and nuts (chiefly raisins, almonds, pistachios), raw cotton and silk, opium, rice,[1] and gums, especially assafœtida. The latter is a villainous-smelling substance used in medicines, and also eaten in India. Recently fresh fruits have begun to be exported from Balúchistán to India, daily fruit trains leaving from Quetta during the season.

Other commercial products are pearls from the Persian

FIG. 227. *Persian traders with pack camels.*

Gulf, sturgeon from the Caspian rivers, and the finest turquoises from Nishapur. The other mineral resources, though rich and varied, are undeveloped. The native wool and silk, however, are extensively woven into rugs on hand looms and dyed with native vegetable dyes.[2]

[1] Rice is the principal cereal, growing up to 4,000 feet in this latitude, while cotton matures up to 6,500 feet, and wheat and barley to 9,000 feet.

[2] Mainly indigo, madder, safflower, and senna, which are believed to fade much less than aniline dyes. Some senna is exported. The centers of rug manufacture in Persia are Tabriz, Sultanabad, and Meshed. Brocades are also made at Tabriz, shawls at Kerman, woolen felts at Isfahan.

These oriental rugs are exported chiefly to the United States. The imports, both of Afghanistan and Persia, are mainly cotton goods and other manufactures, besides sugar and tea. The bulk of the imports are supplied by Great Britain, the Persian Government now being under British control.

354. Trade Routes of the Iranian Plateau. Wagon roads now extend from the Russian frontier well into Persia, and from India to Kábul and Kandahar. (Fig. 227.) Most of the trade with India goes by the Quetta Railway or else by caravan through the historic Kháibar Pass, which has echoed to every invasion of India by land except that of Alexander the Great.[1] Other trade routes begin at Trebizond and various ports on the Tigris and the Persian Gulf.[2]

Afghanistan is in form, and Persia in fact, a buffer state between the British and the Russian possessions in Asia. Afghanistan has no relations with other nations except through Great Britain. In Persia, the northern two-thirds were recognized as within the Russian, and the southern part as within the British, sphere of influence, while the center was a neutral zone. The northern zone was partly occupied by Russian troops, and Russian settlers were pouring in by thousands. Russian influences had also expelled an American director of public finance, who had been called in by Persia and who threatened to put Persia in a position to oppose Russian aggression.

International rivalry has hitherto blocked the construction of through railroads, though a Russo-Indian railroad was a possibility of the future. Except for political complications, the best route for an Indo-European railway would seem to be through Khaibar Pass and the great valley of Herat, "whose history is the history of Central Asia."

[1]Another Indo-Persian trade route starts from Nushki, beyond Quetta, which was reached by the railway in 1906.

[2]Bushire, Bander Abbas, and Lingah, all exposed roadsteads, on the Persian Gulf; Bagdad and Mohammera, where lateral valleys open from the east, on the Tigris.

XXV—WESTERN ASIA

"Where the Turks are, there also are the wolves."
"Where the Turk's horse treads, no grass grows."
—*Popular Proverbs.*

355. Why Western Asia is of Special Interest. In Turkey, far more clearly than in China, a religion and a civilization have been weighed in the balance and found wanting.

The region between the Persian Gulf, the Black Sea, and the Mediterranean, more than any other in the world, is historic ground, sown with ruins that impress even the most careless beholder. Here rose and fell mighty empires whose trade supported the princely commercial cities of Phœnicia and Mesopotamia. Here and in Egypt were developed the practical arts which still form the basis of our civilization.

Moreover from the days when, according to Homer, Hector and Achilles fought beneath the walls of Troy, western Asia has been the theater of a never-ending conflict between the East and the West. Conquered by Alexander, ruled for centuries by Rome, and Christianized as far east as the Tigris, this region was finally overrun by horde after horde of nomads—Arabs (A. D. 635), Turks (1071), Mongols, and Tartars—who destroyed villages and cities, rendering agriculture impossible in order that their flocks might have pasturage. So thorough was their work of destruction that only in the islands and in the mountainous districts, such as Lebanon and Armenia, do the native Christians still predominate.

356. The Decay of Islam. To-day, however, European civilization, armed with steam and electricity and mail-clad fleets that replace the mail-clad warriors of crusading days, is mighty, while Mohammedan Asia is weak. Only the inability of European nations to agree so long suffered the Turk to desolate and pollute with robbery and murder one of the fairest lands in the world; only the successor of the Turk remains to be chosen.

Seeing the handwriting on the wall which foretold the doom of Turkey unless regenerated, and inspired by Japan's example, a reform party among the Turkish army officers indeed forced the Sultan (Abdul Hamid II) to proclaim a constitution (1908), and then dethroned him. But if there is no god but Allah—and Mohammed is his prophet—and the Sultan is his Vice Regent on Earth, what place is there for a Parliament in any Mohammedan country?

357. Arabia. Arabia is a third the size of the United States. Though usually conceived as a sea of sand, the center of Arabia is occupied by a plateau (the Nejd, 5,000 feet elevation) "with long, undulating slopes covered with pasture, and deep, narrow valleys in which lie irrigated gardens and plantations." This plateau is the true home of the Arabs, whence they spread as far as Spain and Java, destroying and founding empires. In the Nejd they maintained their independence of the Turk, who ruled the Red Sea coast. The Nejd is likewise the home of the peerless Arabian horse and the camel, which have been no mean factors in the spread of Arabian dominion.

358. Products of Arabia. The coast of Arabia is rimmed with lofty mountains[1] which condense the moisture of the winds passing over them into heavy rains and even snows, especially in the southwest—the *Arabia Felix* or Araby the Fortunate of the ancients. This region exports Mocha coffee, grown on the terraced and irrigated mountain slopes, besides sheep and goatskins. The shipping ports are Aden and Hodeida, whence a railway has been surveyed inland to the important city of Sana.[2] The Hadramut Valley in the south is famous for fragrant resins which are burned as incense (myrrh, frankincense). These were among the earliest and most valuable articles of commerce. Oman in the southeast, independent of Turkey but a virtual British

[1]Exceeding 10,000 feet in places. An elevation of 10,000 feet in latitude 15° gives an average temperature like that of St. Paul, Minn., in latitude 45°.

[2]About 200 miles inland, at an elevation of 7,500 feet which gives a temperate climate.

protectorate, produces dates for export; and the Bahrein Islands, a British possession, have important pearl beds.

359. The Commerce of Arabia. The Arabs with their "ships of the desert" early became great caravan traders. They were also early driven by their location and necessities to fare in ships across the sea. Since prehistoric times they have had close relations with eastern Africa to the Zambezi, and southern Asia to Java. Before the discovery of the Cape route to India, th y entirely controlled the commerce of the Indian Ocean.

Since the opening of the Suez Canal, the ports of Muscat and Aden have again become distributing points for the commerce of the adjacent parts of Asia and Africa. Aden, situated on a splendid crater harbor, the best within a radius of a thousand miles, is a fortified British coaling and naval station, commanding the approach to the Suez Canal.

Mecca, where Mohammed was born, is the center of the Mohammedan world, which each devout believer faces at prayer and is bidden to visit at least once during his lifetime. These pilgrimages have given rise to a great fair at Mecca, like those of Europe in the Middle Ages. A railway has been surveyed between Mecca and its port, Jidda; another has been built from Damascus through Medina on the way to Mecca.

The exports of Arabia are chiefly coffee, hides, dates, and fragrant resins; the imports are cotton goods and other manufactures. Curiously enough, and for no apparent reason except the preference of the natives, American cotton goods, which do not compete successfully with British cottons in Mexico or South America, are extensively sold at Aden for use in Arabia and Africa.

360. Asia Minor and Asiatic Turkey. Turkey-in-Asia and Asia Minor were (up to 1920) one and the same and embraced three natural divisions, exclusive of Arabia.

Along the Mediterranean is a narrow plain, backed by a belt of hills culminating in the twin mountain ranges of Lebanon and Anti-Lebanon. Between these ranges runs a remarkable

"rift valley," caused by a great fracture of the earth's crust, which is occupied by the Jordan, the Dead Sea, and farther south by the Red Sea. This coastal region is Syria. (Fig. 228.)

East of the coastal region is a broken plateau averaging 2,000 feet elevation, and sloping eastward into a lowland which is traversed by the Euphrates and Tigris rivers. This lowland is Mesopotamia. (Fig. 228.)

Toward the north is a broad and lofty plateau (3,000–8,000 feet high), edged with loftier mountains. This plateau is

FIG. 228. *Syria and Mesopotamia.*

Anatolia or Asia Minor. (Fig. 201.) Toward the east it connects with the Plateau of Iran. It was by this plateau route, which offered an unobstructed passage for their flocks, that the Turks and other nomads came from central Asia.

In latitude and climate, Syria corresponds to southern California, Mesopotamia to Arizona and New Mexico, Anatolia to northern California and the great plateau stretching eastward a thousand miles to Colorado. Asiatic Turkey, excluding Arabia, is about half the size of the United States west of the Dakotas.

The prevailing language is Arabic south, and Turkish north, of the Orontes, though Armenian is spoken in parts of the northeastern mountains, and Greek in Cyprus and the other Turkish islands as well as along the coast of the Ægean. Since the Crusades, however, the language of intercourse with foreigners has been French or the mongrel dialect called *Lingua Franca*.

361. **Stock and Forest Products.** The wealth of Turkey was largely in its flocks, especially sheep eastward of the Jordan where the shepherds of old "watched their flocks by night." Angora goats abounded on the lofty plateau of Anatolia. The fleece of these goats, called mohair, is longer and whiter than wool. The principal beast of burden was the camel. Wool, mohair, and hides were collectively the largest export.

Forests occur on the seaward mountain slopes, especially along the Black Sea, but only in remote districts, as the forests have been largely destroyed to furnish firewood and charcoal. The exported forest products embrace the acorn cups of the valonia oak, and galls or excrescences from another kind of oak, both used for tanning; gum tragacanth, used in calico printing; and mastic, a gum used for chewing. The licorice plant also grows wild, and the roots are largely exported to the United States.

362. **The Need of Irrigation.** In this region by reason of the summer drought, which increases in severity in the subtropical zone toward the south (§190), as in California, agriculture as a rule depends on irrigation. This fact goes far to explain the striking vicissitudes of fortune which western Asia has experienced; for if the artificial water supply be interrupted even for a year, the sands of the desert hasten to reclaim their own. Thus the hill country of Palestine, which the Hebrews found "flowing with milk and honey," and where every man could sit "under his own vine and fig tree," is now but a wilderness of barren rocks, the soil having been washed away after the forests were destroyed. And the words of the prophet who foretold that Babylon should

become a den of wild beasts have been literally fulfilled; for the irrigation system having gone to ruin, the floods of winter have turned vast tracts of Mesopotamia into a fever-breeding marsh, dotted by low mounds marking the sites of splendid cities, while beyond the marsh all is desert.

363. Farm Products. Cereals, consisting chiefly of barley and wheat, are grown in the plains region of Syria along the sea;[1] also, between the ranges of Lebanon and in the edge of the Hauran plateau east of the Jordan; likewise in the moister parts of the Anatolian plateau, especially around Sivas. Barley is an article of export, but the wheat crop is insufficient for domestic use. The staple commercial products are raw silk, subtropical fruits, opium, tobacco, and cotton. The Beirut and Brusa districts are especially noted for silk, Mesopotamia for dates, Jaffa for oranges and lemons, Haifa for olives, Latakia and Samsun for tobacco, Smyrna for opium, raisin grapes, and figs, Cyprus for carobs. These are pods growing on trees and said to be the "locusts" on which St. John subsisted in the wilderness.

In recent years (since 1902) American machinery has invaded these ancient lands, where grain through all the ages had been reaped by hand and threshed by oxen driven around in a circle. (Fig. 95.) The first reaper created the greatest sensation since Mohammed preached his new religion, and nearly caused a riot among the Arabs, who complained that it left nothing for them to glean. Threshers, steam plows, and oil motors for irrigation purposes have also made their appearance on a few great estates.

364. Other Products. In the islands,[2] which were nominally Turkish, sponge fishing was the leading industry. Almost the entire population of the smaller islands follows the sea as sailors or fishermen.

[1] Including the historic plains of Esdraelon, Sharon, and Philistia.

[2] Cyprus, "administered" since 1878 by Great Britain, was formally annexed in 1914. Rhodes and eleven other islands, seized during the Turko-Italian War (1911), are still held by Italy. All of these are Greek in population and Christian in religion.

The mineral resources are rich and varied but largely undeveloped, as in Persia. Thus, extensive oil fields have been located in Mesopotamia,[1] and coal, adjacent to iron, underlies parts of the Anatolian plateau. The minerals actually mined are asphaltum on the Jordan, copper and silver near Kharput, chromium, antimony, and emery in the Smyrna district. Turkey is the largest producer of chromium ore.

The manufactures are principally hand-made textiles, leather, and copper goods. The industrial center for these is Damascus, located where the Barada, after cutting a gorge through the Anti-Lebanon range, irrigates a valley of surpassing fertility. Beirut and Brusa carry on the silk industry in primitive fashion. Smyrna is noted for rugs and carpets, though Turkish and Kurdish rugs, being now dyed with aniline colors, are not in good repute. The "Smyrna" rugs sold in the United States, however, are mostly made in Philadelphia.

365. **Commerce.** The exports of western Asia are chiefly raw materials, besides fruits and rugs, and the imports mainly cotton and woolen manufactures, together with foodstuffs such as sugar, wheat, and rice.

The present commerce of the country is, however, no measure of its resources. The geographic conditions that made possible in this region such prosperous nations in ancient times have not ceased to exist. For example, there is no doubt that Mesopotamia, where wheat was probably native, will again become under European control one of the granaries of the world. It is the human factor here, as throughout the Orient, that limits commerce. The greatest enemy of Turkish commerce is the Turk.

Moreover, western Asia formed in ancient times the great "highway of nations"; and through its gateways, once railways are built, there will again pour the commerce of two continents.

[1]The ancient Greek legend of the Chimæra, a fire-breathing monster, seems to have originated from a column of burning natural gas on the coast of Asia Minor north of Cape Khelidonia. (Mineral Industry, 1902.)

Already the Bagdad Railway is advancing from the west, "scattering before it the Arabian locusts which have so long held possession of these plains."

366. Trade Routes of Western Asia. Commercial centers in Mesopotamia have always arisen opposite passes in the Persian mountains.

The gorge of the Diala, the famous "Median Gate" to Persia, determined the location of ancient Babylon and a whole dynasty of great cities—Seleucia, Ctesiphon, Bagdad—in successive ages. (Fig. 3.) Thence the shortest overland route to the Mediterranean leads through the edge of the Syrian desert by way of Damascus to Beirut or Haifa, on artificial harbors not far from the sites of ancient Tyre and Sidon. From Damascus a narrow gauge cog railway goes over the Lebanon range (5,200 feet) to Beirut, and a standard gauge railway, longer but with easier grades, reaches Haifa through Yarmuk Valley and the plain of Esdraelon, which has been trodden by caravans and armies in all ages.[1] Northward from Damascus, another line traverses the plain to Aleppo; while southward the railway toward Mecca was built by the Sultan to carry the pilgrim traffic and insure to himself a firmer grip on the headship of the Mohammedan world. Damascus, the oldest existing city in the world, has thus become the railway center of modern Syria.

The valley of the Zab Ala likewise determined the location of ancient Nineveh and modern Mosul, which occupies almost the same site. Thence another trade route, in use for ages, runs westward through Aleppo, the Damascus of the North, and the Orontes Valley, to the Mediterranean. The modern port of this region is Alexandretta, having the only good natural harbor in Syria, and easily accessible from the interior through the defile called the Syrian Gates. Alexandretta has

[1]Along the River Kishon. The Litani (Leontes) Valley, nearly opposite the Barada Gorge, was used by ancient Tyre and Sidon to avoid the climb over Lebanon; but the coast near the Litani is now harborless. Haifa and Acre are on the same bay, sheltered toward the south by Mount Carmel.

therefore an excellent site for commerce, whenever railways shall restore overland trade to its former importance.

These two caravan routes—the one through Damascus, Bagdad, and southern Persia, the other through Alexandretta, Mosul, Tehran, Herat, and Kábul—mark the natural routes for a "Southern Pacific" and a "Central Pacific" to India and China, which must some day parallel the "Northern Pacific," already built by Russia across Siberia.

The principal commercial ports in Asia Minor are Trebizond and Samsun on the Black Sea; and Smyrna, having the best natural harbor on the Ægean. Smyrna has now three railways inland, one connecting it with the Bagdad line. This railway, begun by Germany, starts on the Bosporus opposite Constantinople, at the new port of Haidar Pasha, where a car ferry lands trains from Europe without change of passengers or freight. The southern or main line of the Bagdad Railway, descends from the plateau[1] near Adana, rounds the head of Iskanderun Gulf to Alexandretta and reaches the Euphrates at Jerablus. It is completed to Basra, except for the Mosul section between Nisibin and Samara. From Jerablus (ancient Carchemish) near the head of light draft navigation on the Euphrates, the Bagdad road traverses the fertile belt along the foot of the plateau to Nisibin, and follows the Tigris through Bagdad and Basra, the head of navigation for small sea-going vessels, toward a deep-water port on the Persian Gulf, where a great commercial city is destined to arise.

By the Treaty of Sèvres (1920) certain ports are declared to be of international interest. These ports are Constantinople, Hairdar Pasha, Smyrna, Alexandretta, Haifa, Basra, Trebizond and Batum.

Furthermore, such goods in transit are to be free of all customs duties.

Now that the old form of Turkish control has been lifted from parts of western Asia there is reason to believe that prosperity and progress in all lines, agricultural, industrial, and commercial, will again come to this "gateway of the Orient."

[1]Through the Cilician Gates, height 3,500 feet, a defile famous in history.

367. The Right of Conquest. Nations come and go like leaves on the forest trees; the earth remains.

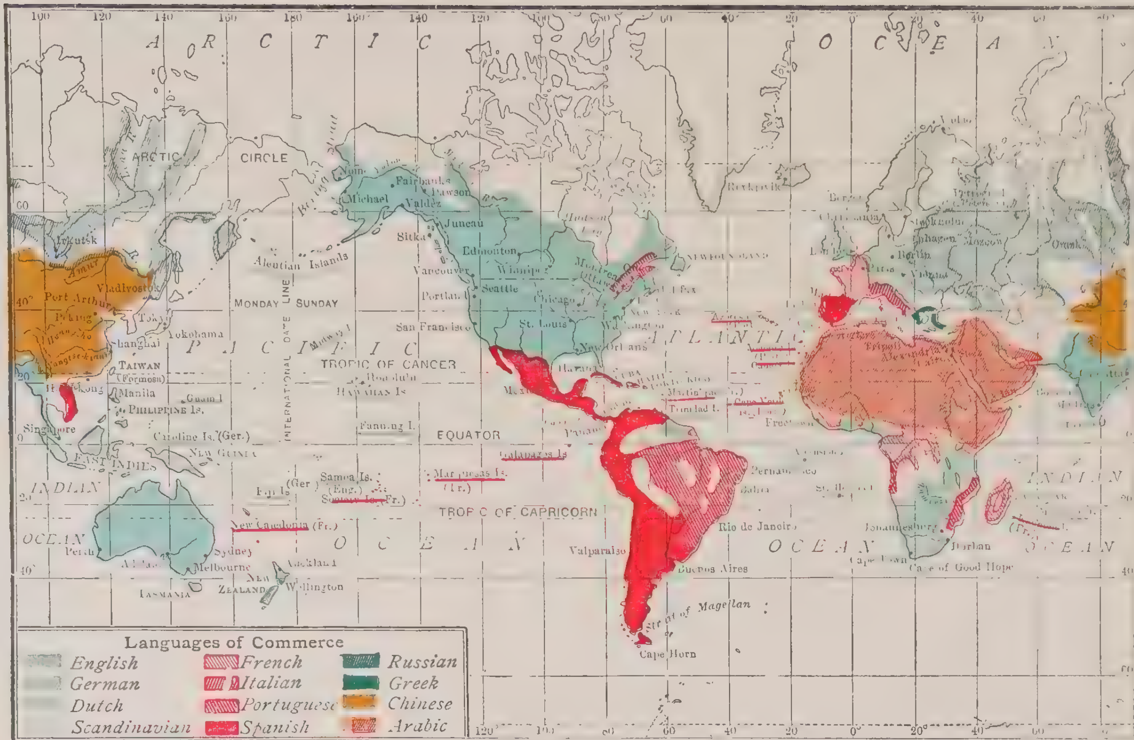
It would seem, therefore, that no nation can have a perpetual title-deed to any part of the earth. It belongs to mankind. At all events, few will seriously maintain that the rest of the human race must forever be denied access to the riches of a land because the inhabitants, perhaps a few naked savages whom chance has placed there, will neither develop the resources of the country themselves nor suffer others so to do.

The European conquest and partition of Africa, though far from justifiable in many of its methods and incidents, is therefore on the whole a justifiable process, carrying light into dark places and placing immense natural resources at the disposal of mankind.

368. The Inhabitants of Africa. Africa south of the Sahara was the original seat of the negro race. In the region north of the Sahara the first inhabitants (Berbers) were of Caucasian stock; later came the Arabs (A. D. 640) who were also originally Caucasians. But the slave trade has introduced so much negro blood along the Mediterranean that Shakspere was right in representing the Moor Othello as colored.

The pastoral Arabs, at home in the desert, have now established the faith of Mohammed over all the grass-bearing plateau as far as Zanzibar in the east, and almost to the Gulf of [illegible] the steaming, [illegible]r forested lowlands.

The map of Africa to-day resembles that of America in the seventeenth century, showing the same patchwork of colonies without natural boundaries. (Fig. 230.) These colonies are mostly the children of accident and diplomacy, incapable of withstanding the first shock of arms.



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Data from Bartholomew's Atlas of World's Commerce

FIG. 229. *The principal languages of commerce.*

Glasgow
Liverpool
Queenstown
London
NORTH SEA
Hamburg
Copenhagen
Berlin
Paris
Vienna
Trieste
Marseille
Rome
Odessa
Danube R.
Don R.
Volga R.
BLACK SEA
CAUCASUS MOUNTAINS
CASPIAN SEA
LAKE ARAL
Constantinople
Trebizond
Smyrna
Athens
CRETE
CYPRUS
Madrid
Lisbon
Naples
SICILY
SARDINIA
Tunis
Algiers
Oran
Constantine
Bône
TUNISIA
Biskra
Tangier
Tetuan
Strait of Gibraltar
Fez
Meknes
MOROCCO
Marrakesh
(France)
ALGERIA
(FR.)
Tripoli
Benghazi
CYRENAICA
Alexandria
Port Said
SUEZ CANAL
Suez
Cairo
EL FAIYUM
Asyut
EGYPT
Aswan
1st Cataract
Halfa
2d Cataract
3d Cataract
NUBIA
Port Sudan
Suakin
Mecca
Berber
4th Cataract
5th Cataract
6th Cataract
ANGLO-EGYPTIAN
SUDAN
Omdurman
Khartoum
Kassala
Massaua
Aden
GULF OF ADEN
Socotra I. (Br.)
C. Guardafui
Obock
Tah et Mandeb
Djibuti
Berbera
BR. SOMALI LAND
ABYSSINIA
Kodok
Bahr el
AZORES (PORT.)
MADEIRA IS. (PORT.)
Funchal
CANARY IS. (SPAIN)
Ifni (Span.)
Las Palmas
RIO DE ORO
Villa Cisneros
C. Blanco
CORO
ADRAR
Twat Oases
Ghadames
LIBYA
TRIPOLITANIA (Italy)
FEZZAN
LIBYAN DESERT
Oasis of Kufra
TROPIC OF CANCER
SAHARA
MAURITANIA
Timbuktu
Agades
AIR
TIBESTI
Borku
FRENCH WEST AFRICA
SENEGAL
Dakar (FR.)
Kayes
UPPER SENEGAL AND NIGER
Bamako
Kong
Sokoto
KANO
Kano
BORNU
Zungeru
Bida (BR.)
NIGERIA
L. Chad
BAGIRMI
WADAI
Abeshr
FRENCH EQUATORIAL AFRICA
CAPE VERDE IS. (PORT.)
St. Louis
Cape Verde
Bathurst
GAMBIA (BR.)
PORT. GUINEA
FRENCH GUINEA
SIERRA LEONE
LIBERIA
GOLD COAST
TOGOLAND
DAHOMEY
Niger R.
Senegal R.
Gambia R.
Volta R.
Nile R.
Blue Nile
White Nile
Atbara R.
Tigris R.
Euphrates R.
PERSIAN GULF
ARABIA
Latitude North
13000 ft.
15000 ft.
6500 ft.

FIG. 230. *Africa, 1922.*

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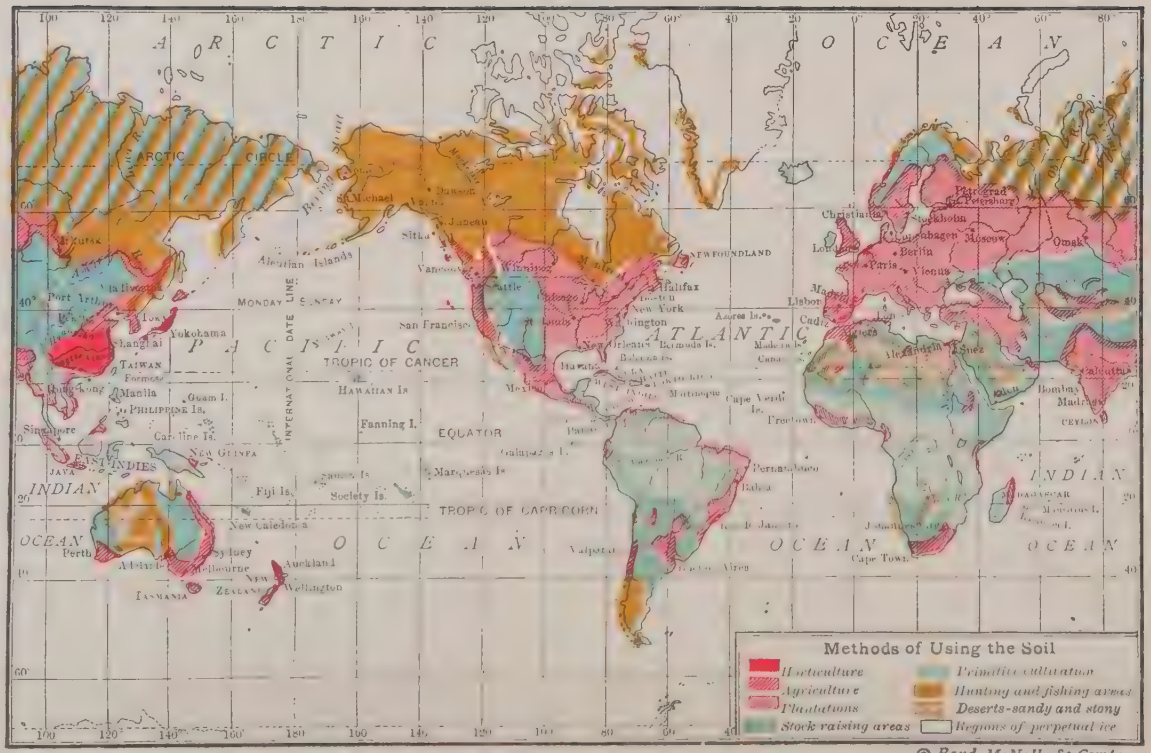

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Courtesy of Clarence T. Johnston

FIG. 232. *The "shaduf", a method of irrigation used in Egypt since the early Pharaohs.*

369. The Continent of Africa. Africa, though no longer a land of fable and mystery, is still the "Dark Continent" in point of civilization, because the least accessible and the most tropical.

It has proportionately the least coast line; and being for the most part an elevated plateau, the rivers are nearly all broken a short distance inland, where they plunge over the edge of the plateau. This has hindered navigation.

Africa is the most characteristically tropical because the equator crosses almost the center of the continent. Africa alone thus has a complete series of climatic belts, from North Temperate to South Temperate (§48).

As in South America, however, the great elevation of the plateau above sea level carries a fairly temperate climate far within the Tropics; especially along the backbone of the continent, extending from Abyssinia to the Cape of Good Hope.

370. Natural Resources of Egypt. Egypt is, in the words of Herodotus, "the gift of the Nile." The river, swollen by summer rains in equatorial Africa, both waters and fertilizes its valley, stretching like a narrow ribbon of green through the wide, thirsty desert. For this reason the ancient Egyptians worshiped the life-giving river as a god.

The resources of Egypt are thus almost exclusively agricultural. Land flooded by the river bears one crop, land diked and perennially irrigated (Fig. 232) bears three crops a year: in autumn, maize and millet; in winter, wheat, barley, beans, and clover; in summer, cotton and rice in the delta, sugar cane and dates in the valley, with figs in El Faiyum, an old lake basin. Cotton, having a long fiber resembling Sea Island, is far and away the principal export.

On the upper Nile, from Berber south, there are forests, due to the heavier rainfall nearer the equator. These forests yield various gums, especially gum arabic, used in mucilage. This has, however, been partly supplanted by an artificial gum (dextrine). There is evidence that the ancient Egyptians obtained gold and other metals from the same region.

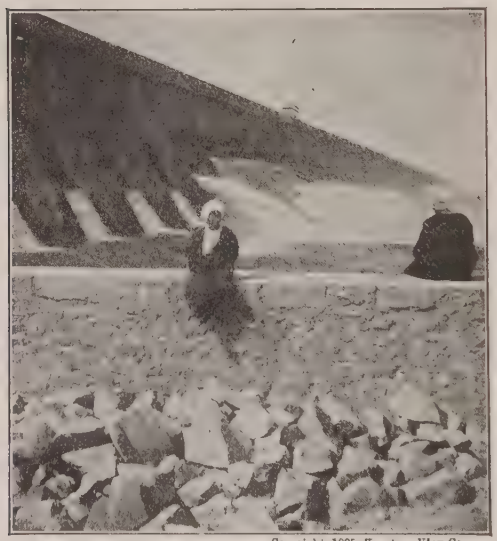
Courtesy of Clarence T. Johnston

FIG. 233. *The old and the new in Egypt—Pyramids and an electric trolley.*

The only extensive manufacture is the rolling of cigarettes from imported tobacco. Hand labor is largely employed.

371. The Renaissance of Egypt. Since a mutiny in the Egyptian army compelled European interference (1882), in order to protect the Suez Canal, Egypt has been virtually a British possession and a few years ago (1914) was declared a British protectorate. In the Sudan, however, from Halfa to Kodok, the Egyptian and British flags fly together.

The effects have been revolutionary. A few European officials, chosen from among several nations, have been able, by means of honesty and economy in handling public money, to reduce taxation and abolish forced labor—the means by which the pyramids (Fig. 233) were built and all subsequent works executed—yet at the same time to pay off much of the public debt and to carry out irrigation projects of commanding importance. These, indeed, bid fair by increasing both the area irrigated and the effectiveness of irrigation, to double or even treble the productive powers of Egypt. The great dam at Aswan (Fig. 234) is worthy to rank with anything ever done in this land of titanic achievements. Already Egypt probably exceeds in population and prosperity the palmiest days of the ancient Pharaohs.



Copyright, 1905, Keystone View Co.

FIG. 234. *Downstream face of Aswan Dam with gates open.*

372. The Commerce of Egypt. The Nile Valley is the only natural highway from central Africa to the Mediterranean. Navigation is, indeed, broken by six cataracts, but a lock and canal at Aswan now carry the head of navigation to Halfa, and a railway extends southward to Khartoum.

The foreign commerce of Egypt passes chiefly through Alexandria, thus justifying the foresight of its founder. The metropolis of Egypt and of Africa, however, is Cairo, standing near the site of ancient Memphis, at the head of the delta where the railways now converge to enter the narrow valley. Cairo also has canals to Alexandria and to the Suez Canal. Port Said, at the entrance of the Suez Canal, is rising into prominence as a coaling and transhipment port. Port Sudan, a new harbor near Suakin on the Red Sea, with a railroad to Berber on the Nile, is the outlet for the commerce of the upper Nile Valley.

373. The Suez Canal. The most important artificial water way in the world, measured by its commercial and political effects, is the Suez Canal.[1]

It effectively opened India and the Far East to European commerce. It restored to the Mediterranean countries, at the expense of London and other Atlantic ports, much of the prosperity which they enjoyed before Vasco da Gama rounded the Cape of Good Hope. It brought the English to Egypt; and it compels the English, or some other European nation permanently to garrison Egypt in order to safeguard the commerce of the world.

374. Other North African States. Libya (Tripolitania and Cyrenaica) was conquered by Italy from Turkey during the war of 1911–12. Tunisia is a French protectorate. Algeria is considered a part of France.[2] Morocco, though nominally an independent empire, has become, since 1912 a French

[1] Opened 1869; 87 miles long, of which 21 are through lakes; passable by vessels drawing 31 ft. Deepening (to a uniform depth of 40 ft.) is in progress.

[2] The dates of aquisition are: Algeria, 1830; Tunisia, 1881; Morocco, recognized by Great Britain as a French sphere of influence in 1904, and by Europe as a French protectorate in 1912.

protectorate, though Spain occupies Ceuta and a zone along the Mediterranean. The native states having all ended in corrupt and feeble despotisms, France seems by reason of her position and power to be the natural heir of the Arab and the Turk in North Africa.

In Tripoli the Sahara meets the sea along a low, sandy shore; elsewhere, the lofty Atlas range intervenes, rising in two distinct terraces. As in Syria and southern California, rain comes in winter from the west winds, while the summer

Courtesy of Clarence T. Johnston

FIG. 235. *Arab plowing in North Africa — a typical team.*

is almost rainless. Irrigation is therefore indispensable to continuous cropping (Fig. 235), though in many districts grain can be grown in winter every other year without irrigation, as in the Great Basin region of North America. The best watered, and therefore the choicest, part of North Africa is Morocco, which lies the most exposed to the west winds.

North Africa is well adapted to white colonization. Algiers, indeed, lies in the latitude of St. Louis, Mo. There are now over half a million European settlers, largely Italians in Tunisia, French in Algeria, French and Spaniards in Morocco.

375. Products of North Africa West of Egypt. North Africa is in the main a grazing country, pasturing sheep and goats. The arid plateau on the second rise above the coastal plain, however, grows esparto grass (alfa), used in European paper mills; and the mountains rising above this second terrace bear the cork oak. The lands in the valleys and along the foot of the mountains produce cereals, chiefly barley and wheat, also beans, chick-peas, and subtropical fruits. Almonds are especially abundant in Morocco; figs and grapes in Algeria; olives and dates in Tunisia. The tobacco crop, though large, is not of high grade. In the French possessions, early vegetables for the French markets, poultry, and bees have acquired some importance.

The coastal waters produce sponges and tunny (tuna), huge fish many times the size of a man. The mineral resources are valuable. Zinc, iron, and phosphate of lime are already largely exported. Manufactures comprise Morocco leather, Fez caps, carpets, and blankets, nearly all hand work.

376. Commerce of North Africa West of Egypt. The principal exports are foodstuffs and raw materials, while the imports are manufactures, especially cotton goods, besides coffee and sugar.

In addition, the exports comprise ivory, ostrich feathers, gum arabic, and goatskins, which caravans bring across the Sahara as they have done for ages past. This transit trade centers at the port of Tripoli, whence the route across the Sahara is shortest and least obstructed by mountains.

In the French possessions, railways penetrate to the edge of the Sahara, while a trunk line parallels the coast. At every step, moreover, on roads, harbors, and cities, one sees the impress of France. The transformation which she has wrought here is most impressive.

The principal ports are Tunis near ancient Carthage, now accessible by canal to seagoing vessels; Bône in eastern, Algiers in central, and Oran in western Algeria; and Tangier in Morocco, near the Strait of Gibraltar.

The Sahara, lying in the trade-wind belt, is barren wherever level. But oases, crowned with date palms and densely peopled, are found in depressions wherever the ground water reaches the surface; and also along the foot of ridges lofty enough to produce rainfall. These highlands (Tibesti, Air, Aderar), resembling the Nejd in Arabia, support a population of several millions; and the area of cultivation can be greatly extended by driving artesian wells as the French have begun to do. The commercial products, besides dates, are salt, ostrich feathers, camel's hair, and gum arabic.

377. The Sudan. The Sudan is a belt of grasslands over 600 miles wide (approximately 20°–10° N.), having summer rains but rainless winters like the llanos of South America. The Sudan is fertile and not unhealthful. It is by all odds the most promising part of tropical Africa, with a population of many millions, and several cities containing 70,000 to 100,000 inhabitants. The camel-owning Arabs, crossing the Sahara, have subjugated the cattle-owning and agricultural negroes of the Sudan up to the edge of the great equatorial forests, and established various well-organized Mohammedan empires, notably Sokoto and Bornu. These are now controlled by France or England.

Classified according to the principal means of support of the people, the Sahara proper is a camel zone, containing also the wild ostrich; the northern half of the Sudan is a cattle zone, while the southern half is a millet zone, raising also cotton, indigo, and tobacco. This region is the chief reliance of France and England in their attempt to become independent of the United States in the supply of raw cotton. Finally, the forested country to the south is a banana zone.

The points of departure for Mediterranean caravans are Timbuktu, on the northern bend of the Niger, and Lake Chad. A railway, however, now connects the upper Niger, above the falls, with the head of navigation (Kayes) on the Senegal, thus opening the western Sudan, as the railway from the Nile to the Red Sea has opened the eastern Sudan, to direct

European commerce. Another railway extends from the coast to Kano, the principal trade center in Nigeria.

378. **The Horn of Africa.** The horn of Africa, east of the Egyptian Sudan, is chiefly a plain, arid because the monsoons, which are governed by Asia (§51), blow parallel to the coast. This plain is consequently peopled only by wandering shepherd tribes. It is now divided among three European nations.[1]

From this plain rises abruptly the lofty volcanic plateau of Abyssinia, the Switzerland of Africa. In this mountain fastness the Abyssinians, of mixed Arab and negro descent but Christian since the fourth century, have bade defiance alike to Mohammedans and Europeans.

All products from tropical to cold temperate can be grown at different elevations, but the pastoral mode of life prevails. The difficulty of transportation limits exports to articles of small bulk, such as gold, ivory, civet (perfume), beeswax, and coffee. Abyssinia is believed to be the original home of the upland coffee tree. The imports are largely cotton goods, of which the United States supplies a large share, as in Arabia. The railway inland to the plateau causes trade to pass mainly through the French port of Jibuti.

379. **"The World of the Great Forest."** Equatorial Africa (10°N.–10°S.), receiving heavy rains from the ascending air currents, is densely forested, particularly in the region of the Atlantic slope. It is peopled, especially in the lowlands, by fragments of beaten tribes who have found refuge in "the great almshouse of the Tropics," where Nature is so lavish of her bounty that no incentive remains for labor. The climate is such that West Africa is commonly called by the natives "the white man's grave." Politically, this region is cut up into a large number of colonies ruled by five different nations of Europe, besides Liberia which is nominally independent.

The most valuable products are ivory, which has been for Africa all that the fur trade was for America, and forest

[1] Italy has two sections of the coast, with the port of Massawa; England, the coast around Berbera; France, Obok at the entrance of the Red Sea, with the port of Jibuti.

products—especially palm oil, palm kernels, and shea nuts on the west coast, rubber from a giant creeper, copal resin, camwood yielding a red dye, mangrove bark for tanning, and cola nuts, the last named furnishing a powerful stimulant.

The principal export crops are oil seeds (peanuts, sesame, castor beans) on the Senegal; lowland or Liberian coffee in the west, and upland coffee in East Africa; cocoa on the slopes of Cameroon volcano; and cloves on Zanzibar and Pemba, which supply most of the cloves of commerce. There are also large plantations of cotton, rubber, and sisal.

Gold-bearing sands occur in the rivers along the "Gold Coast," and tin is found in the Bauchi Plateau.

380. The Commerce of Equatorial Africa. Commerce mainly follows the water ways in West Africa,[1] especially the Niger and the mighty Congo, the Amazon of Africa, which drains the basin of a former inland sea. There are, however, an increasing number of short railways running inland from the chief ports. There is also one around Stanley Falls, on the Congo, and another will connect the Congo with the Nile.

East Africa, on the other hand, where the lowlands are narrow, depends entirely on land transportation. A railway now connects the fine port of Mombasa with Lake Victoria, the largest lake in the world; and another line extends from Dar es Salaam to Lake Tanganyika

The lofty plateau of East Africa, largely covered with grass or small scrub and having a climate almost temperate, because of altitude, even under the equator, is the natural route of the proposed Cape-to-Cairo Railway, just as the Andean plateau is of the Pan-American.

381. "White Man's Africa." South of 10° S., the high plateau (3,000–7,000 feet elevation) spreads out westward, occupying almost the entire width of the continent. This section has been called "white man's Africa," being well

[1]The West African rivers are navigable as follows: Senegal to Kayes, 460 miles; Gambia, 220; Niger to Rabba, 450; Benue almost to source; Congo to Boma and again from Stanley Pool to Stanley Falls, offering with its tributaries 7,000 miles of navigable waters.

suited for settlement by Europeans. (Fig. 230.) The Boers show what manner of men the high veldt (plateau) produces in temperate South Africa.

Politically, most of South Africa is British, and forms a self-governing federation like Canada. In southern Africa the Portuguese also have large possessions. The white population is, however, predominantly Dutch in blood. The colored population, which outnumbers the white probably ten to one, has been further recruited by Hindus imported to work the

FIG. 236. *The market place at Johannesburg.*

plantations, and by Chinese to work the mines—though the latter are being gradually sent back to China.

382. Products of the Soil in South Africa. The zone between 10° and 20° S., including most of Rhodesia, is a belt of grassland corresponding in latitude and climate to the Sudan. Some coffee is grown on the seaward slopes, and cotton is a promising crop on the plateau. Farther south,

on the Natal lowlands, the chief export crop is sugar cane, while the uplands grow some tea for local use.

South Africa receives summer rains chiefly from the southeast trade wind, only the southern tip having rain in winter from the westerly winds. As in Australia, the mountains on the eastern shore condense the moisture on their seaward slope, leaving most of the interior too dry for agriculture.

South Africa, therefore, is in the main a pastoral country, raising chiefly sheep and goats, with cattle on the richer pastures of the north and east. Ostrich farming is also a large industry. The zebra, immune against the tsetse fly but long reputed untamable, is both ridden and driven. In the agricultural zone, consisting of a strip perhaps 100 miles wide across the south and another 300 miles wide along the east, cereals are grown, but much food must be imported. The climate is very favorable to fruits, which command better prices because they ripen during the northern winter. The bark of a tree, the black wattle, native to Australia, is largely exported for use in tanning.

383. Other Resources of South Africa. South Africa near the Zambezi has been identified by some, on account of its ancient ruins, as the Ophir of King Solomon.

The Kimberley mines now supply nearly all (98 per cent) of the world's diamonds. Other diamond deposits have also begun to be worked in sections of Southwest Africa. The Transvaal, near Johannesburg, and Rhodesia contain the largest known deposits of gold. (Fig. 138.) South Africa is also rich in copper, lead, and zinc, especially at Broken Hill; while coal, iron, and limestone lie side by side on both flanks of the Drakenberg Range. Coal is mined in Natal and the Transvaal, also in the rich Wankies Field near Victoria Falls. Oil fields exist in Angola, and large guano deposits in the arid parts of Southwest Africa.

Water power is also available along the edge of the plateau, especially at Victoria Falls, where the Zambezi, 2,000 yards wide, falls 450 feet and is estimated to afford twice the

power of Niagara. It, however, varies considerably with the seasons, shrinking in winter and rising in summer.

384. Trade Routes and Trade Centers of South Africa. The one natural water way is the Zambezi, navigable to Tete (260 miles); while a tributary is navigable, except for one break, to Lake Nyasa.

The principal railway net is in Southeast Africa. A trunk line extends from Cape Town well across the Zambezi, with several branches to the eastern coast. This is a part of the projected Cape-to-Cairo line, which is likely to be an accomplished fact long before the Pan-American Railway is completed. At Victoria Falls the Zambezi Valley narrows so as to be spanned by a bridge, the loftiest in the world, thus avoiding the steep grades and deadly climate of the lower Zambezi. The railways on the west coast are as yet short, disconnected lines; but a through line is building from Lobito Bay,[1] which will save three or four days for passengers and mail between London and Johannesburg. The railways in the Union have been connected with those in the Southwest Africa Protectorate (German Southwest Africa).

The ports on the south are Cape Town, Port Elizabeth, the leading grain port, and East London, all having either exposed or artificial harbors. As trade follows the lines of least resistance, it has largely shifted to ports[2] nearer the principal market at Johannesburg, the commercial center of the gold fields (Fig. 236); especially Durban, on a landlocked harbor now accessible to large vessels, and Lourenço Marques, on Delagoa Bay, sometimes called "the key of South Africa." The outlet of Rhodesia is Beira, another Portuguese port.

The Cape was first occupied by the Dutch, and seized by the English during the Napoleonic wars, as a station on the

[1]The contract provided for the building of 870 miles, to the Katanga copper district, by 1911, but it has been delayed.

[2]The road from Durban enters the Orange Free State through Van Reenens Pass (5,500 feet), and the Transvaal through Laings Nek, the scene of many battles. A second and more direct railway (337 miles) has been undertaken from Lourenço Marques to Johannesburg. The Beira line to Salisbury is 350 miles long and connects at Buluwayo with the Cape line.

way to India. Despite the Suez Canal, the great naval station at False Bay is still a vital link in the British Empire.

385. The Commerce of South Africa. The commercial importance of South Africa arises mostly from its exports of gold, diamonds, and wool, and, to a lesser extent, from mohair, hides, and ostrich feathers. (Fig. 237.) The principal imports are textiles and other manufactures, besides foodstuffs. South Africa, being practically as near by water to the United States as to Europe, is a market of great promise for American commerce.

Three-fourths of the commerce of Africa originates in the temperate sections at the extremes of the continent, which

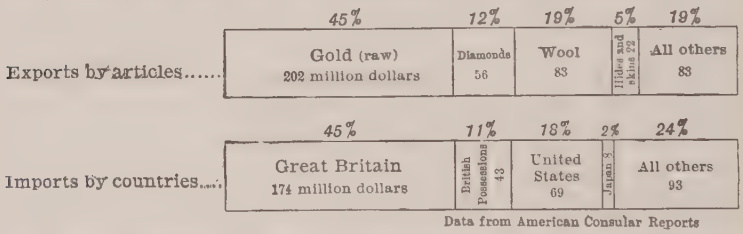


FIG. 237. *Commerce of Union of South Africa. Totals, two-year averages (millions of dollars): exports, 446, nearly all (74%) to Great Britain; imports, 387, mostly (74%) manufactures.*

illustrates the effect of climate; and nine-tenths of American commerce with Africa is carried on with the British possessions, which illustrates the effect of language and customs.

386. African Islands in the Atlantic. The Atlantic groups associated with Africa have fertile volcanic soil, but irrigation is usually needful in the lowlands. The Madeira Islands, enjoying a climate of perpetual spring, export chiefly wine and southern fruits. The Canaries—the *Insulae Fortunatae* or Fortunate Isles of the ancients—produce early vegetables, butter, and eggs, largely for the steamer trade; also a dye moss called orchilla (litmus), dyeing blue, and the cochineal insect, grown on a species of cactus and yielding a red color. The Cape Verde group, a tropical colony with a colored population, raises quantities of castor beans. The islands in the Gulf of

Guinea grow cocoa and coffee, using negro "contract" labor that is slave labor in all but name. Ascension and St. Helena —the scene of Napoleon's captivity—are practically barren and useless since the nibbling goat has destroyed the forests.

The chief value of the Atlantic islands[1] lies in their excellent harbors—Funchal, Las Palmas, and St. Vincent—admirably placed to serve as cable, coaling, and supply stations on the routes to South America and South Africa. For this reason they are jealously watched by the great commercial nations.

387. African Islands in the Indian Ocean. The islands in the Indian Ocean[2] are partly volcanic and partly coralline, while Madagascar is a fragment of some continent, possibly one which extended to India and Australia. The native population is a mixture of negro, Arab, Hindu, and Malay. In Mauritius, where Hindus and Chinese were imported as laborers, they have gotten hold of the landed property both in town and country, and have largely ousted their former employers.

The products of Madagascar are gold, cattle from the lofty temperate plateau, and forest products from the slopes, especially rubber, raffia (a palm fiber), and beeswax. On the lesser islands the staple crops are sugar cane, vanilla, and cocoanuts. Mauritius also produces aloe fiber, which resembles sisal fiber. The principal commercial port in Madagascar is Tamatave, the outlet by rail of the lofty interior plateau.

[1] Politically, the Madeira and Cape Verde islands, also St. Thomas and Principe, are Portuguese; the Canary Islands, Fernando Po, and Annobon are Spanish; Ascension and St. Helena are British.

[2] British, except Réunion, Madagascar, and the islands to the westward of Madagascar, which are French. Most of the whites are, however, of French descent and language. In Madagascar the Hovas, the ruling race, were mostly converted by English missionaries before the French conquest.

388. Surface and Climate of Europe. Europe is merely a peninsula of Asia, and in both continents the principal mountains run from east to west (§128). An older mountain system (in part, a much eroded plateau) traverses the British Islands and the Scandinavian Peninsula. A younger mountain system, or series of systems, extends across the south, including the Pyrenees, Alps, Carpathians, and Caucasus mountains, which are continued still farther eastward by the Hindu Kush and Himálayan ranges. Between the older and the younger upland regions extends the great North European Plain, which rises but little above sea level. (Fig. 239.)

Adjacent to Europe lie three great inland seas—the Mediterranean, Black, and Baltic. The North Sea is also, in effect, inland; and there are numerous lesser gulfs and bays, separated by projections of the land. As a result, there is said to be no place in Europe a thousand miles from salt water.

Latitude alone would render the larger part of Europe frigid. Nearly all of it lies farther north than New York, and all but the Mediterranean peninsulas lies farther north than Minneapolis. The east and west trend of the mountains, however, sharply differentiates the climate of the Mediterranean region from that of the northern plain (§128); and at the same time it permits the moderating influence of the Atlantic to be borne far inland by the prevailing westerly winds. There are consequently three climatic regions. The Mediterranean is of the mild subtropical type, with winter rains (§52). The west European region, north of the Pyrenees and Alps, is never very hot nor very cold, but is usually very moist, with the heaviest rainfall in winter just as in Washington and British Columbia. The east European region, comprising chiefly Russia, is marked by greater extremes of heat and cold and is rather dry, with the most rainfall in

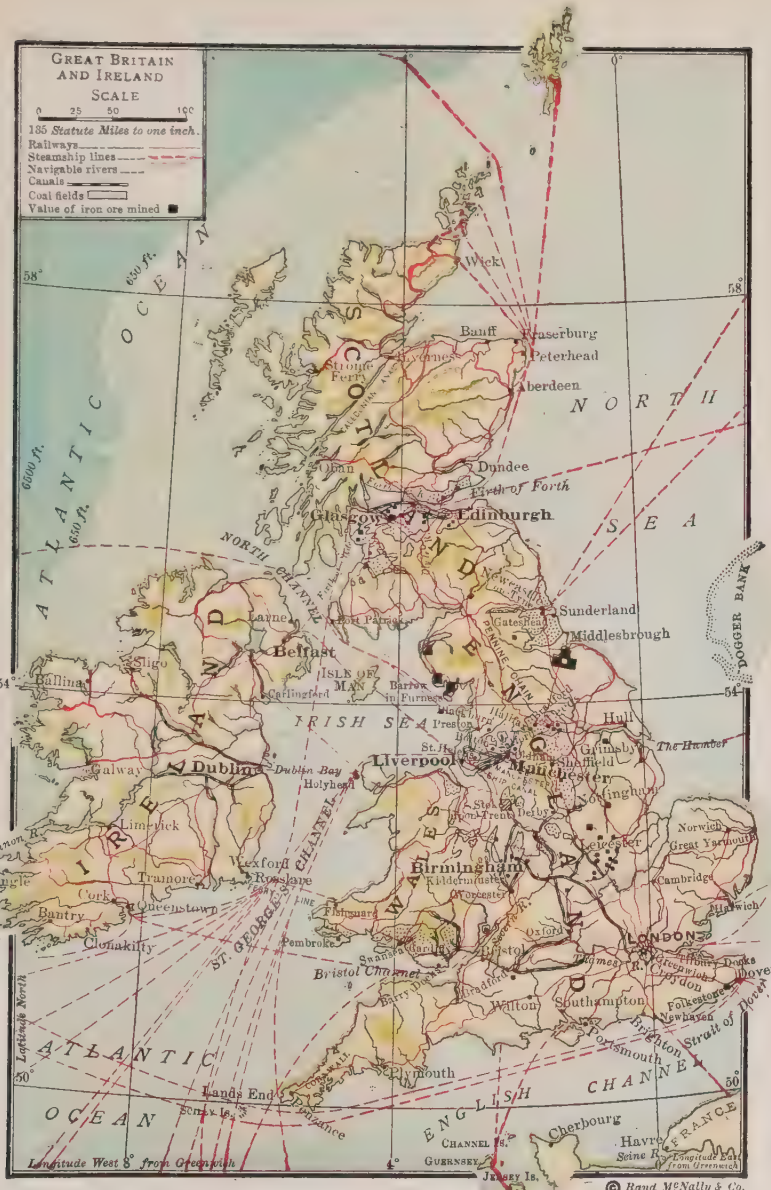
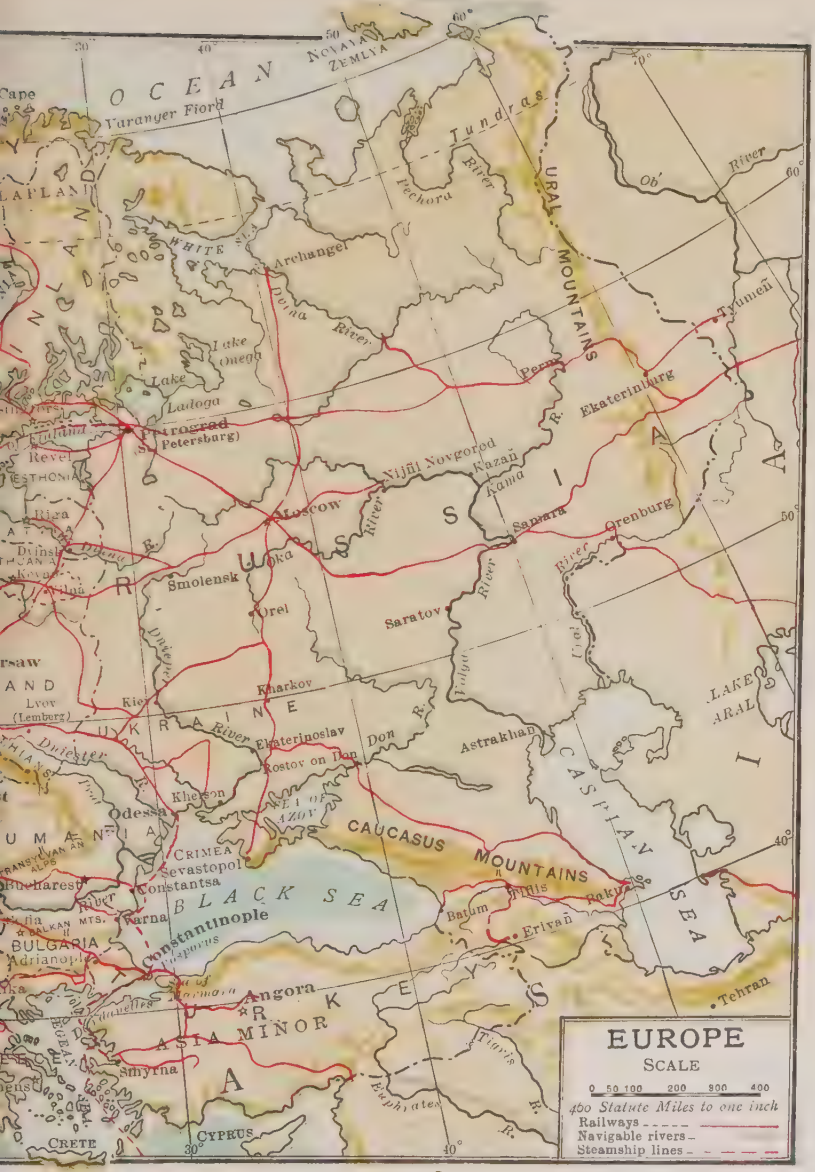


FIG. 238. *Great Britain and Ireland.*

ARCTIC
ATLANTIC
OCEAN
Reykjavik
ICELAND
ARCTIC CIRCLE
LOFOTEN Is.
THE FAEROES
SHETLAND Is.
ORKNEY Is.
HEBRIDES
NORTH
GREAT
BRITAIN
Glasgow
Edinburgh
Liverpool
Manchester
London
Belfast
Dublin
IRISH FREE STATE
Cork
Bergen
Christiania
Trondhjem
Stockholm
Göteborg
Copenhagen
Hamburg
Berlin
Danzig
Brussels
Antwerp
Calais
Brest
Paris
Cherbourg
English Channel
C. Finisterre
Bay of Biscay
FRANCE
Bordeaux
Bayonne
PYRENEES
Lyon
Marseille
Nice
CORSICA
Bern
Basle
Strasbourg
Munich
Leipzig
Dresden
Frankfurt
CZECHOSLO
Vienna
AUSTRIA
Prague
Vienna
Budapest
Milan
Turin
Florence
Rome
Naples
Palermo
SICILY
Messina
Durazzo
Oporto
Douro R.
Lisbon
Cape St. Vincent
PORTUGAL
SPAIN
Madrid
Barcelona
Valencia
SIERRA MORENA
Cadiz
Straits of Gibraltar
Malaga
Cartagena
Gibraltar
BALEARIC ISLANDS
SARDINIA
MEDITERRANEAN
Algiers
Oran
Tunis
Fez
AFRICA
MALTA (Br.)
Latitude North
Longitude West of Greenwich
Longitude East of Greenwich

FIG. 2


EUROPE
SCALE
0 50 100 200 300 400
400 Statute Miles to one inch
Railways
Navigable rivers
Steamship lines
OCEAN
Nova Zemlya
Varanger Fiord
Cape
LAPLAND
Tundras
Pechora River
Ob' River
URAL MOUNTAINS
WHITE SEA
Archangel
Dvina River
Lake Onega
Lake Ladoga
Petrograd (St. Petersburg)
Revel
ESTHONIA
Riga
Dvina R.
Dnieper
Vilna
Kovno
Moscow
Nijni Novgorod
Kazan
Kama R.
Perm
Ekaterinburg
Tyumen
Samara
Orenburg
Volga River
Smolensk
Oka R.
Orel
Saratov
Kharkov
Kiev
Lvov (Lemberg)
UKRAINE
Ekaterinoslav
Rostov on Don
Don R.
Astrakhan
Volga River
Ural River
LAKE ARAL
CASPIAN SEA
Kherson
SEA OF AZOV
Odessa
CRIMEA
Sevastopol
CAUCASUS MOUNTAINS
Kuban R.
Rion
Batum
Erivan
Tiflis
Kuma R.
Bucharest
Constantsa
BLACK SEA
Varna
BULGARIA
Constantinople
Bosphorus
Adrianople
Sea of Marmora
Dardanelles
Angora
ASIA MINOR
Smyrna
Euphrates R.
Tigris R.
Tehran
CRETE
CYPRUS
Copyright by Rand McNally & Company, Chicago

rope

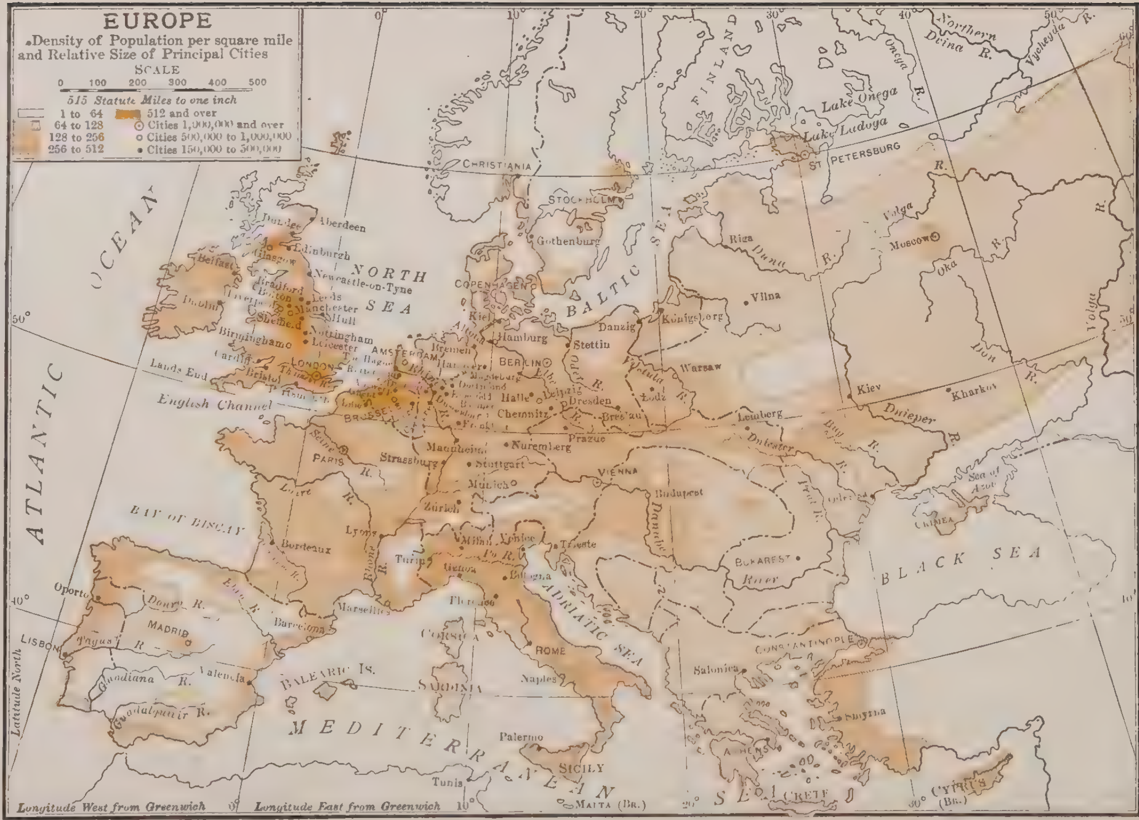


FIG. 240. *Density of population of Europe.*

summer, resembling the Dakotas. North of the Alps, the climate thus varies more from west to east than from south to north. (Fig. 241.)

389. Why Europe is Civilized. Europe is the true fatherland of civilization. To it the younger nations in America, Australia, South Africa, and the islands of the sea look back as to their old home.

The elements of material civilization were, indeed, derived from the Orient; but the development of the arts that adorn

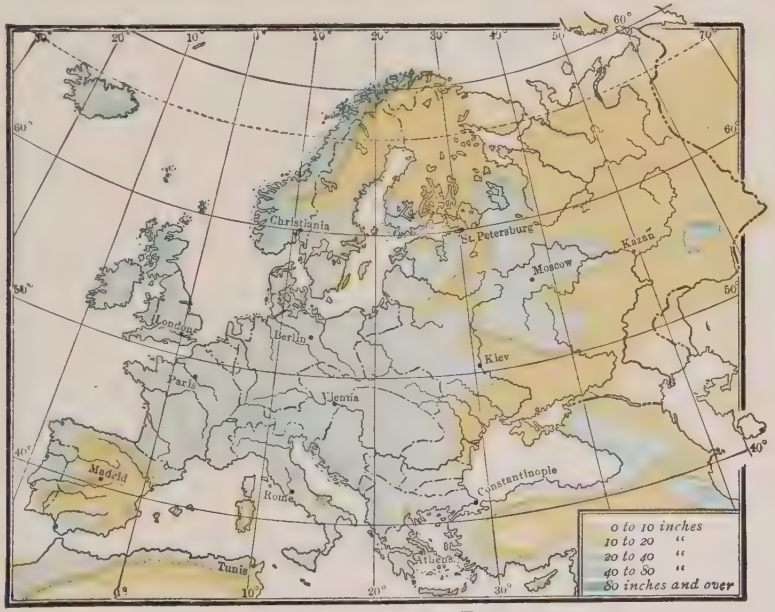


FIG. 241. *Rainfall of Europe.*

and the inward graces of character that ennoble human life took place on the soil of Europe. This it was that came to pass in ancient Greece and rendered it the fountain head of culture for the western world.

The rapid advance of Europe in civilization, outstripping lands like Egypt, Mesopotamia, India, and China that had a start of thousands of years, was largely a matter of

climate (which compelled the accumulation of resources for winter) and of surface features. It was in fact due in no small measure to the wealth of Europe in seas, gulfs, and peninsulas, which carry both the climatic and commercial influence of the ocean far inland. This was even more clearly the case in Greece (§35).

FIG. 242. *Balkan Peninsula and Rumania.*

The civilization of Europe also owes much to race and religion (§57.) A Mongolian Europe would doubtless be in many respects another China, and a Mohammedan Europe but a larger Turkey, sunk in squalor and decay.

390. The Peoples of Europe. The diversity of the land is reflected in the people. Nowhere else are there so many civilized nations and cultivated languages in so small an area. The population is also very dense. Thus Europe, only a trifle larger than the United States and Alaska, contains twenty-eight independent nations, besides five actual or virtual protectorates (Luxembourg, Liechtenstein, San Marino, Andorra, Monaco); in all, thirty-three states more or less sovereign. (Fig. 239.) Their combined population is in round numbers 400,000,000, practically the same as China.

Measured by language, most of the European peoples are

Aryan, like the ancient Persians and the northern Hindus. They fall into six groups. (Fig. 229.) In the south are the Latin nations—the Portuguese, Spaniards, French, Italians, and Rumanians—all speaking dialects derived from the tongue of ancient Rome. In the northwest around the North Sea are the Teutonic nations, Scandinavians, Germans, Dutch, Flemish (in northern Belgium), and English. In the east are the Slavic peoples, Russians, Poles, Bohemians, Serbians, Bulgarians, and others. Also Aryan by speech, though belonging to neither of these groups, are the Greeks, and Albanians in the Balkan Peninsula; the Celts in Ireland, Wales, Brittany, and the highlands of Scotland; finally the Lithuanians on the Baltic.

Outside the circle of Aryan peoples are the Basques in the Pyrenees, of unknown relationship; also the Turks, Hungarians, Tartars, Lapps, and Finns, all of Mongolian speech and Asiatic origin.

391. Why the Balkan Peninsula is Undeveloped. The Balkan Peninsula (Fig. 242) contains Greece, the cradle of European civilization; Macedonia, the home of Alexander, who carried this civilization to the gates of India; and Constantinople, the Imperial City where it survived the dark and stormy night of the Middle Ages. Yet the Balkan Peninsula is to-day the most barbarous and commercially the least developed part of Europe.

One reason is that its valleys open toward the barbarous East. It is thus exposed to invasion from southern Russia and western Asia. By these routes came Slavs, Bulgarians, and Turks, who between them destroyed the Eastern Empire.

Another reason is that the mountains render transportation difficult. Moreover, they separate the peninsula into distinct districts now occupied by different races, languages, and religions, whose constant strife has rendered economic progress all but impossible.

Besides the Turks, who are largely outnumbered in this area by Christians, the inhabitants of the Balkan Peninsula

comprise: (1) Greeks, living on all the coasts and islands in addition to Greece; (2) Albanians, in part Mohammedan, along the Adriatic; (3) Serbians[1] in the west and Bulgarians[2] in the east, both Slavic peoples; (4) Rumanians (that is, Romans) in the mountains of northern Greece and Serbia, as well as in Rumania and Hungary.[3] The Christians are almost solidly Greek Catholic except along the Adriatic, where they are in part Roman Catholic.

The bond of union between the widely-sundered Greeks is now, as in ancient times, the sea; and Greek, far from being a "dead language," is next to French the principal commercial language of the eastern Mediterranean.

392. The Agricultural Products of Greece. Greece, like southern California, is almost rainless in summer, when the northeast trade winds begin farthest north. Irrigation is therefore needful for agriculture, especially toward the south and east. Greece is consequently in large part a pastoral country, raising sheep and goats. Mount Hymettos, however, is still famous for honey; and the mountain slopes, though now largely stripped of timber, and consequently of soil, bear patches of valonia oak, used for tanning. The island fisheries also yield excellent sponges.

The plains and valleys, though small, are fertile and have been in all ages the centers of population. Ancient Athens was embowered in olive groves which yielded her chief article of export, and olives are still important throughout Greece. Here, as in other Mediterranean countries, pasturage dries up in summer unless irrigated. Dairy products are consequently expensive, and olive oil is commonly used in place of butter. It likewise takes the place, to some extent, of meat in the diet

[1] Inhabiting from the Balkans to the Adriatic, south of the Drava River—that is, a region several times the size of Serbia.

[2] Named from a tribe of Finns who settled there and adopted the Slavic tongue.

[3] Thus showing that the eastern as well as the western provinces of the Roman Empire must have adopted the Latin tongue before the barbarian invasions, except where Greek prevailed. See Partsch, *Central Europe*, p. 128.

of the people. The main support of modern Greek commerce, however, is the "currant," a small seedless grape grown chiefly in the Patras district. In addition, southern Greece produces wine, figs, and raw silk. In central Greece the land formerly occupied by Lake Kopais, now drained, is planted with cotton. Thessaly, the dry bed of a great lake which finally secured an outlet through the famous Vale of Tempe, grows wheat, corn, and barley.

The plains of Macedonia also grow grain and excellent "Turkish" tobacco, while the Greek islands produce wine, olives, oranges, and carobs.

393. Other Products of Greece. The mineral resources of Greece are varied and more developed, because near the sea, than elsewhere in the Balkan Peninsula. The silver-lead deposits of Laurion, which built the Athenian navy, thereby founding the political power of ancient Athens, are still productive. Iron, manganese, zinc, antimony, and chrome are also mined. Naxos yields emery; Eubœa, magnesite; and Paros, the finest marble. In Macedonia are the gold and silver deposits which once furnished the means for the conquests of Philip and of Alexander the Great, though their present value remains to be determined.

Coal, except for a little lignite, is lacking. Nevertheless Greece, like Switzerland, is making some headway in manufactures, using water power at Vodena, and imported coal at Piræus, the chief manufacturing center of Greece, to operate cotton, paper, and flour mills.

Railways from Athens penetrate and circle the Peloponnesus (Morea), extending to Kalamata. Another line from Athens through Larissa (once the home of Achilles) will connect with Salonika, making Piræus a rival of Brindisi for the mail and passenger traffic with the Far East.

The trade of Old Greece largely centers at Piræus, the port of Athens, and at Patras. Both profit from the Corinthian Canal (1893), which saves twenty hours, though many ships avoid it because narrow and beset by strong winds and

currents. (Fig. 243.) Volos is the port of Thessaly, as Kalamata is of southern Greece. In the islands Hermoupolis or Syra, a free port with a splendid harbor, is an important coaling and fishing station. Corfu occupies a similar position in the Adriatic.

In New Greece the principal port is Salonika, on a deep bay

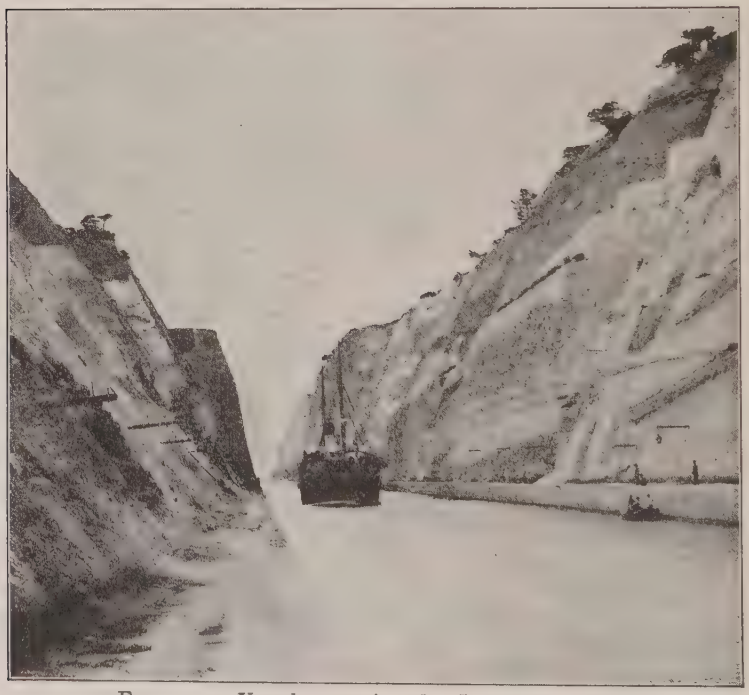


FIG. 243. *Vessel traversing the Corinthian Canal.*

at the head of the Ægean, the natural outlet of the Balkan Peninsula toward the Suez Canal.

394. The Commerce of Greece. The United States has direct steamship connection with Greece and is a large purchaser of the principal Grecian exports—currants and ores. Other countries supply most of the Grecian imports, which are mainly foodstuffs, raw cotton, and manufactured goods.

395. Serbia and Montenegro. After the peace of Versailles (1918) Serbia and Montenegro became integral parts of the Serb-Croat-Slovene Kingdom (Yugoslavia). Montenegro consists largely of mountain pastures, which support sheep and goats, with some cattle. It has, however, a few miles of seacoast on the Adriatic.

Serbia was originally forested with oak, and the acorns fed immense herds of swine. This condition still exists in remote districts, and the forests there also furnish lumber for staves. In the main, however, Serbia is now a region of upland pastures, supporting sheep and cattle. Agriculture has made some progress in the valleys, especially along the Vardar and in the rich upland basin around Monastir, which fell to Serbia after the war with Turkey (1913). All the common grains are grown, besides plums for prunes and brandy. The mountains are said to abound in metals, and there is a small output of coal. Manufactures are mostly household industries carried on by hand as in western Europe during the Middle Ages.

396. Bulgaria. Bulgaria comprises chiefly the two slopes of the Balkan Mountains (which have ever formed the Bulgarian stronghold in times of trouble) together with the adjacent valleys. In the division of Turkey, Bulgaria also secured the Rhodope range, with the Ægean coast between the Mesta and Maritsa rivers but lost the latter in the World War.

The uplands are largely under natural grass, as in Serbia, and animal products are important exports. The first place, however, is held by grain, chiefly wheat, grown in the broad Danube Valley. The southern slope of the Balkans, which serve like the Alps as a climatic boundary, produces grapes, tobacco, silk, rice in the Maritsa Valley, and roses around Šipka or "Wild Rose" Pass for the manufacture of attar of roses. Silk production, formerly an important industry, declined because of disease among the silkworms, but has been revived with considerable success. In Bulgaria, as in Serbia, minerals are abundant, though mostly unworked, except for a small output of coal. The principal factory industry (and that but

little developed) is the weaving of woolen goods by water power along the foot of the Balkans.

397. Turkey in Europe. Turkey in Europe was reduced, as a result of the Balkan War (1913), to the wide plain east of the Marista (ancient Thrace), Gallipoli Peninsula, and the rugged peninsula containing Constantinople. All but this last was lost as a result of the World War (1914–18). Most of the population in the Thracian plain, and all of it in the islands, is Greek, since the Turks are still by preference pastoral, keeping sheep and goats on the hill pastures.

The rugged surface practically limits agriculture to the plain of the Maritsa. The soil there is worked in primitive fashion, chiefly by the Greek population, producing for export wheat, opium, raw silk, and tobacco. There are also valuable fisheries, especially in the Sea of Marmara.

The export manufactures are chiefly carpets woven by hand, leather goods, and attar of roses.

398. The Commerce of Turkey. Turkey in Europe, as in Asia, exports chiefly raw materials, besides rugs and dried fruits; and imports mainly manufactured goods.

Constantinople, which has a splendid harbor on the Bosporus, occupies a position of commanding importance, both strategic and commercial. The chain of lofty mountains stretching from the Atlantic eastward across Europe is broken only in two places—in France by the gap between the Pyrenees and the Alps, and at Constantinople by navigable water giving direct access to the Black Sea, and thus to the vast north European and north Asiatic plain. What this position would mean under decent government passes imagination. Constantinople, moreover, has one railway running along the coastal plain to the west and another extending to the Danube by way of the Maritsa-Morava Pass (2,400 feet). This line of communication is the route of the Orient Express from Paris. (Fig. 239.)

Adrianople, at the head of navigation on the Maritsa, commands the valley leading up to the Šipka (Shipka) Pass across

the Balkans. It is therefore a fortress as well as a market. In all ages the great "diagonal furrows" formed by the Vardar and Maritsa valleys have been the chief routes both of commerce and of war.

399. **Rumania.** Rumania, another independent country, is the strongest of the states which have arisen on the ruins of Turkey. Embracing the northern part of the Danube Valley, together with Transylvania, Bukovina and two-thirds of the Banat, it is one of the granaries of Europe. The principal crops are corn, wheat, and other small grains, besides flax and colza seeds for oil. Before the World War Rumania ranked high in the export of corn. (Figs. 190 and 277.) Grapes and plums also occupy some land. The region east of the Danube is a pastoral plateau, supporting sheep and cattle. The Carpathians furnish timber, also great quantities of salt and petroleum. The oil wells are largely run by water power, and pipe lines extend to the Black Sea at Constantsa (Kustenji). Manufactures are chiefly flour and lumber.

400. **Commerce of Danubian States.** These countries are commercially much alike. They all export pastoral and agricultural products; Rumania also exports petroleum. They thus compete in European markets with American farm products. The imports mainly are textile and metal manufactures, trade for the most part being with Central and Northern Europe.

The great highway of commerce is the Danube, though it is icebound for two months. As far as the Iron Gate, where the river has cut through the Carpathians and a canal was built around the rapids, the Danube was under the control of an International Commission. The pre-war powers of this commission has been revived and the Upper Danube is controlled by a new International Commission.

The trunk-line railway from Paris, crossing the river at Belgrade, the commercial center of Serbia, follows the Morava Valley to Nish, where it forks to Salonika and Constantinople. The eastern or Constantinople line traverses the plateau on which Sofia, the capital of Bulgaria, stands at the focus of

mountain valleys. The chief railway over the Balkans also passes through Sofia.[1] Bucharest, the capital of Rumania, is a natural railway center in the middle of a wide plain.

The principal river ports are Ruschuk, connected also by rail with the sea, and Braila; the larger seagoing vessels, however, stop at Galatz. The Black Sea ports are poorly sheltered by nature. Varna is an exposed anchorage; Burgas has (since 1903) an artificial harbor, like Constantsa (Kustenji). Greece now has the sheltered harbor, Port Lagos, on the Ægean, which was to have been connected by rail with Sofia and made the principal Bulgarian outlet by sea. Constantsa, where Trajan's wall from the Danube formerly reached the sea, has become of European importance since the river was bridged to give railway connection with western Europe. The Germans in particular were making it a stepping stone for their expected commercial conquest of the Levant until defeated in the World War.

[1] Following the gorges of the Isker and Struma, but not yet completed to Salonika. The Isker is the only river piercing the Balkans, though a railroad has now been laid over the Trjevna Pass (3,360 feet), in spite of the abrupt slope on the south.

401. Italy. Venice is farther north than Minneapolis, and Rome is in the latitude of Chicago. The startling difference in climate is due largely to the sheltering wall of the Alps along the north of Italy. (§128, Fig. 244.)

The Po Valley, once an arm of the sea, is fertile and well watered. Peninsular Italy, on the other hand, has thin and stony soil except in a few small plains, and it lies in the zone of summer drought (§52).

A similar difference exists in the people. The north Italian barely understands the speech of the south Italian, and is much the better educated. Such unequal yokefellows have created many difficulties since the union of Italy (1871).

402. Forest and Animal Products in Italy. "Man traverses the earth and a desert results." This hard saying, referring to the effects of deforestation, is nowhere better illustrated than in Italy, where the forests of Roman days are now represented chiefly by "macchie"—scattered shrubs of a semi-desert character. The cork oak, however, is still found in Sardinia, also sumac and the licorice plant in the south, while chestnut plantations are widely distributed at moderate elevations. Boiled chestnuts are a staple food.

Goats graze in the mountains; sheep on the dry plateaus, especially in Apulia; cattle in the moister plains west of the Apennines, like the Roman campagna, and on the rich irrigated meadows of the Po. Imported cattle are fattened there, and Parmesan cheese is famous. Even more important are poultry and eggs for northern markets.

403. Crop Products in Italy. The north is the more prosperous because considerable districts are irrigated by unfailing Alpine streams. The food crops are wheat or barley in winter, corn in summer, rice on the irrigable lowlands, and beans as a substitute for meat. The staple food of the

common people is polenta, a sort of cornmeal mush. The industrial products are raw silk, chiefly from the Po basin, flax around Cremona, and hemp around Bologna; also, in recent years, sugar beets. Nowhere has the beet-sugar industry grown more rapidly, since imported sugar has been heavily taxed.

FIG. 244. *Italy.*

South of the Apennines, where the climate is subtropical, the commercial products are chiefly wine and olive oil, of which Italy is the largest producer; south of Naples and in Sicily, also "English" walnuts, figs, almonds, citrons, oranges, and lemons. Chick-peas and wheat are also grown in southern

Italy, especially durum or macaroni wheat, though a crooked stick still commonly serves for a plow as in Vergil's day.

404. **Other Resources of Italy.** The Italian fisheries are especially rich between the islands and the mainland. They yield sardines and anchovies which are both tinned in oil, besides tunny and coral, the latter used in ornaments.

Most of Italy is of recent geological age and poor in minerals; but the islands of Sardinia and Elba, with parts of the mainland, are fragments of a very ancient land (Tyrrhenia) now mostly sunk beneath the sea, which are rich in ores of nearly all the metals, especially zinc, lead, and iron. In addition there are large sulphur deposits in Sicily, marble at Carrara, borax in Tuscany, besides small deposits of petroleum and lignite in the Apennines. Sicily furnishes a large part of the world's sulphur. (Fig. 90.)

495. **Manufactures of Italy.** The lack of abundant coal has limited manufactures in the main to artistic hand work; but this lack is now being made good in part by the Alpine streams, which are increasingly used to generate electricity. The principal use of power machinery is in the textile industry. The materials used are chiefly silk at Milan, cotton at Genoa, wool at Turin and at Biella in the Alps. Iron is worked to some extent at Terni, near lignite beds, and at Savona and Elba, which burn imported coal. Other manufactures are macaroni from hard wheat, and soap from the poorer grades of olive oil. Tobacco, salt, and gasoline are government monopolies.

Technical schools have been established in many districts, with an advanced school of commerce at Venice to hasten the industrial revolution. As yet, however, it is impossible, owing to the rapid increase of population in Italy, and the limited natural resources, to fill the multitude of hungry mouths; consequently hundreds of thousands of Italians have been emigrating every year. Their remittances to friends at home are assuredly one of the chief resources of Italy. Southern Italy, indeed, has lived largely on America.

406. Transportation Routes and Trade Centers of Italy. Like Greece, though less completely, Italy is built in compartments separated by mountains and facing the sea; but, unlike Greece, Italy lacks natural harbors, except near the ends of the peninsula where the mountains descend abruptly to deep water.

By virtue of its position, Italy is the heart of the Mediterranean world. It has, moreover, been commercially regenerated by the Suez Canal (1869), which again sent the main current of oriental trade through the Mediterranean; and by the Alpine tunnels,[1] which have in effect removed the commercial barrier of the Alps. In fact, the bulk of Italian commerce now goes by rail across the land frontiers.

The Po system, supplemented by canals, is navigable to Valenza and the Italian Alpine lakes. Railways radiating from Milan, the greatest industrial center, extend along both coasts, and are connected by several transverse lines across the Apennines. The railways are fed in part by automobile lines running on highways built by the Cæsars.

Genoa, the chief port of Italy,[2] is also through the Alpine tunnels the Mediterranean outlet of Switzerland and the upper Rhine Valley. In fact, it is a rival of Marseille for the commerce of central Europe. (Fig. 239.) Leghorn (Livorno), on an artificial harbor, is the port of Florence and, indeed, of all central Italy,[3] while Naples, on a beautiful bay under the

[1]The Alpine railways are as follows:

CONNECTING	OPENED	PASS USED	LENGTH MAIN TUNNEL	ELEVATION OF RAILWAY
Venice-Vienna	1854	Semmering		2,970 ft.
Venice-Munich	1867	Brenner		4,470 ft.
Turin-Lyons	1871	Mt. Cenis	7.6 mi.	4,380 ft.
Milan-Zürich	1882	St. Gothard	9.3 mi.	3,785 ft.
Milan-Geneva	1906	Simplon	12.3 mi.	2,313 ft.
Trieste-Salzburg	1907	Hohe Tauern	5.3 mi.	3,999 ft.

Italy is also connected along the coastal plain with Marseille, and with Trieste.

[2]Opposite the Bocchetta Pass (2,550 feet) over the Apennines.

[3]By way of the railways from Bologna and Faenza.

shadow of Vesuvius, is the port of the fertile Campanian plain. Venice is built on islands in a landlocked lagoon which is now dredged for modern vessels and equipped with modern docks and elevators; and it is again after many days the outlet toward the Levant of northern Italy. It is also an important outlet of the upper Danube Valley over the Brenner Pass, though Genoa and Trieste now hold most of the trans-Alpine trade on which Venice once grew rich. Brindisi is the mail and passenger port of London, Paris, and Berlin for the Levant, India, and the Far East. In Sicily,

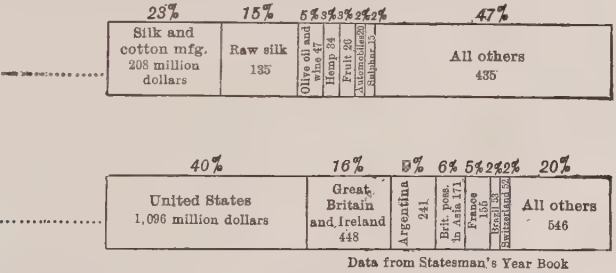


FIG. 245. *The commerce of Italy. Totals, five-year averages (millions of dollars): exports, 920; imports, 2,762.*

the meeting place of nations, which has been held in turn by all the rulers of the Mediterranean, the principal modern ports are Palermo (Greek Panormus) and Messina, the latter commanding the strait where the ancients fabled that Scylla and Charybdis lay in wait for the unwary mariner. Though often destroyed by earthquakes, Messina has been as often rebuilt.

407. Commerce and Colonies of Italy. The exports of Italy comprise raw silk, olive oil, fruit, and other agricultural products, besides cotton and silk manufactures and automobiles. The imports are more varied, including raw cotton and other raw materials, coal, foodstuffs, and nearly all kinds of manufactures. (Fig. 245.)

From these facts it is evident that Italy, while making progress in manufactures, is still predominantly agricultural.

The outlying possessions of Italy comprise Libya in North Africa and two stretches of arid coast in the Horn of Africa with the port of Massawa; the twelve islands lying near Asia Minor have finally been ceded to Greece.

408. The Iberian Peninsula. "Africa begins at the Pyrenees." This saying of the French applies in a measure both to the people and the country.

The original inhabitants resembled the Berbers of North Africa, and there is also a strong infusion of Moorish blood.

FIG. 246. *The Iberian Peninsula.*

Both Portuguese and Spaniards, except the Basques in the Pyrenees, now speak dialects derived from Latin.

The surface of the peninsula (Fig. 246) resembles Africa in that it consists for the most part of a lofty table-land (over 3,000 feet), traversed by mountain ranges which drain the winds of moisture. The coast line is also similar to that of Africa, in that it lacks deep indentations. The climate on the

plateau is one of great extremes, and the summers are almost rainless, especially in the south. The northern and western coasts are the best watered, and therefore the most thickly peopled, aside from the irrigated districts along the Mediterranean.

409. **Forest and Animal Products in Spain and Portugal.** The forests have mostly disappeared, under the combined attack of sheep, goats, and charcoal burners. Oak and chestnut groves are, however, still found in the north, besides cork oak and carob trees on the southern mountains. Cork is an article of export, especially from Barcelona and Seville.

The central plateau is pastoral rather than agricultural, having for the most part a rainfall of between ten and twenty inches. It is largely a range country for flocks of sheep, which migrate to the mountains in summer and to the lower lands in winter. Spain was long the home of the merino breed, noted for fine wool. The moister provinces of the northwest also pasture cattle; the oak and chestnut forests feed swine; parts of the south raise fine horses of Arab breed; and the mountains everywhere support goats, asses, and mules, which greatly outnumber horses. In recent years dairy products, poultry, and eggs have become commercial products in northern Spain.

410. **Crop Products of Spain and Portugal.** Agriculture is most successful in a zone along the shore, and in the *vegas* or plains of the Tagus, Ebro, and Guadalquivir. This agricultural belt is widest in the northwest, where temperate crops are grown, especially wheat and barley, besides chick-peas, onions, and sugar beets. Since the loss of Cuba, Spain has developed her beet-sugar industry sufficiently to meet the home demand. Other foodstuffs, however, are largely imported.

The principal agricultural exports are wine, especially from Portugal and southern Spain, besides southern fruits largely from the irrigated *huertas* or gardens between Malaga and Valencia. The Spanish Peninsula ranks next to Italy in its crop of olives, which are perhaps most abundant about

Seville. It likewise exports almonds, grown on sheltered hillsides, raisins and "Malaga" grapes from Almeria, and oranges and onions from Valencia. Another export crop, especially around Valencia, is saffron, a dye stuff largely used in French silk mills.

Similar to the Mediterranean coast in climate and products are the Balearic and Canary islands, which are considered part of Spain; and the Madeira and Azores islands, which are considered part of Portugal.

411. Other Products of Spain and Portugal. The fisheries yield the usual Mediterranean varieties—sardine, anchovy, tunny—besides lobsters on the rocky northern coast.

The mines of Spain equipped the army of Hannibal which all but destroyed Rome; and the Spanish Peninsula is still the richest mineral region in Europe, especially in the great industrial metals. Iron ore of rare purity is abundant, especially near the northern coast. Copper is extensively mined at Rio Tinto, silver-lead at Liná́res, zinc in the northwest, mercury at Almadén. There are in addition large deposits of salt and sulphur; and the coal fields exceed in area those of France, Germany, Austria, and Hungary. Though located near iron ore, they are not much worked.

The manufactures of Spain comprise, aside from purely local industries, chiefly tobacco goods (a government monopoly) at Seville; iron and glass along the northern coast; and textiles, leather, shoes, and paper at Barcelona, the principal industrial city in Spain. The people of Barcelona, speaking a language (Catalan) more French than Spanish, are very different from the proud, military Castilian of the plateau, or the guitar-playing Andalusian of the south; and they are far more redoubtable competitors.

In Portugal some cotton and other goods for the colonies are manufactured with imported coal, chiefly at Lisbon.

412. Trade Routes and Centers of the Iberian Peninsula. The plateau, rising abruptly near the sea, interrupts river

navigation[1] and renders railroads very costly to build and operate. Moreover, the Pyrenees were uncrossed by rail[2] until 1912, when the first of three tunnels provided for by treaty was finished. However, all the railroads differ in gauge from the French, thus forcing both passengers and goods to change cars at the frontier. The railways naturally converge at Madrid in the center of the plateau.

Since the loss of her American colonies, Spain faces commercially toward the Mediterranean, as Portugal does toward the Atlantic. The principal commercial ports are Barcelona on the Mediterranean, having a deep harbor commanding the broad Ebro Valley; Lisbon in the west, at the mouth of the Tagus; and Bilbao in the north, the leading iron port. Oporto also ships much wine (hence *port* wine) and Cartagena handles Spanish trade with Africa.[3]

The Iberian Peninsula, jutting far into the Atlantic, is the final point of departure for many vessels bound to South Africa, South America, or the West Indies. Lisbon is thus in a measure the passenger and mail port of Paris, Berlin, and Vienna for the New World.

413. **Commerce and Colonies of Spain and Portugal.** As a result of the character of the country, the leading items of export from Portugal are wine and cork; while in the case of Spain they are minerals, wine, and cork. (Fig. 247.) In both, the imports comprise chiefly grain and manufactures.

Spain established the first empire on which the sun never set; but this empire has now shrunk to a few islands and pieces of coast in West Africa and in Morocco. The loss of the colonies, however, has proved a blessing in disguise, causing

[1] Steam navigation is possible only to Santarem on the Tagus, Seville on the Guadalquivir, Tortosa on the Ebro (by the aid of canals); small boats, however, reach Abrantes, Córdoba, and Logroño.

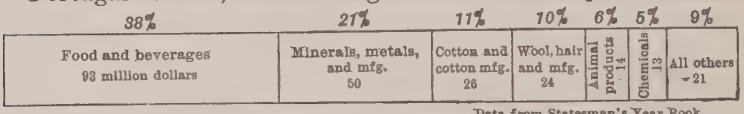
[2] Though offering lower passes than the Alps, as the famous pass of Roncesvalles (3,960 feet); also Perche (5,282 feet); Perthus (2,392 feet)—the last two conveniently placed for Barcelona.

[3] Other ports are Santander and Gijon, the port of the chief coal district, in the north; Cadiz, the outlet of the Guadalquivir Valley, in the south; Malaga, Almeria, and Valencia on the Mediterranean.

Spaniards to invest their money at home and thus develop the country.

Andorra, a little republic in the Pyrenees dating back to Charlemagne, is under the joint protection of a Spanish bishop and of France.

Portugal retains, besides fragments of her empire in India



Data from Statesman's Year Book

FIG. 247. *Exports of Spain. Total, five-year average: 241 million dollars, largely to Great Britain and France.*

and the Far East, rich territories on both coasts of Africa The Portuguese colonies are now in the main self-supporting.

It is understood that France has an option on the Spanish, and England on the Portuguese, colonies, in case they shall be for sale.

414. **British Possessions in the Mediterranean.** Malta and two adjacent islands, peopled by a mixed Arab-Italian race, grow early vegetables and fruit for the London market. Having a fine harbor, situated on the strait between Sicily and Africa, Malta is also a great British coaling and naval station, as well as a port of call for merchant vessels.

To the ancients, Ceuta and Gibraltar were known as the Pillars of Hercules. The towering rock of Gibraltar, connected with the mainland only by a sand bank and commanding the entrance to the Mediterranean, is now the strongest fortress in the world. Upon it depends, in no small measure, the continuance of the British Empire in India. Because of its position, Gibraltar is likewise important as a coaling station and port of call on the Mediterranean route.

415. Austria and Hungary. Austria-Hungary (Fig. 248) was a dual monarchy, pieced together by war and the renowned skill of the Hapsburgs in matchmaking. The only natural connecting link was the Danube, which drains three-fourths of the region.

Austria and Hungary had a common ruler, and a Customs Union whenever they could agree, but separate governments. Each state, moreover, contained hostile races[1] whose mutual hatreds reacted most unfavorably on industry and commerce. As a result of the World War the dual State was shattered, five nations—Italy, Poland, Rumania, Serb-Croat-Slovene Kingdom (Yugoslavia), and Czechoslovakia—sharing in the distribution of much of the area of the empire, while Austria and Hungary became separate states.

416. Products of the Soil. Forests still cover perhaps a third of the region, including the mountains, except along the Adriatic; and there is some export of timber. (Fig. 259.)

The *pusztas* or prairies of Hungary, connecting with the steppes of Russia and of Asia, formed the highway by which various nomadic peoples entered the country, the last being the Magyars or Hungarians (A. D. 898). These *pusztas* are still largely given over to pastoral life, as are also the mountains. Horses are extensively raised in Hungary, sheep on the Bohemian Plateau, dairy cattle in the Alps, swine in the oak forests of Transylvania (Rumania), and goats along the Adriatic. The poultry industry is also very important in Bohemia (Czechoslovakia), and bees are kept in many districts.

Tillage of the soil, however, occupies the larger part of the people, especially in Hungary; and the railways, by furnishing a market for grain, cause the plow to encroach year by year

[1]Besides Germans and Hungarians (Magyars) there are Italians in the south, Rumanians in the east, and many kinds of Slavs—Bohemians, Moravians, Poles, Ruthenians, Slovaks, Slovenes, Croatians, and Serbians, besides others of less note.

upon the grasslands. The leading field crops are wheat and corn in the plains of Hungary; rye, oats, and potatoes on the highlands, where there is a heavier rainfall. Temperate fruits are abundant in the north and southern fruits on the Mediterranean slope. The south-facing hills in Hungary also yield the noted Tokay wine grape. The other industrial products are raw silk in southern Tyrol (Trentino, Italy); barley, hops, and sugar beets on the coal fields, and flax on the higher plateau

FIG. 248. *Austria, Hungary, and Czechoslovakia*

of Bohemia; hemp and tobacco in Hungary. Flax, hemp, and tobacco all lost ground before Russian competition. (Fig. 83.)

417. Fisheries and Minerals. The thousand miles of Adriatic seacoast, indented and fringed with islands, support a fishing population. These Adriatic seamen, bred to the sea almost from infancy, whose ancestors manned the Roman navy, are among the best in the world.

There are three mineral districts in the region: the Alps, Bohemia, and the Carpathians. Their metallic wealth rivals that of Spain, including iron especially at Eisenerz (Iron Ore), lead at Bleiberg (Lead Mount), and mercury at Idria, besides some silver and zinc. Other mineral resources are graphite at Budejovice (Fig. 224), salt near Salzburg (Saltville) and Cracow, petroleum around Lvov on the northern slope of the Carpathians, lignite widely distributed, and true coal in the north—Bohemia, Moravia (Czechoslovakia), Galicia (Poland).

418. Manufactures. To journey from Belgrade to the frontier of Germany is to survey several past centuries coexisting at the present time. Hungary manufactures little except flour, for which the dry climate is very favorable. The preparation and sale of tobacco are reserved to the government. From Vienna north and west, on the other hand, is a manufacturing district. The leading industries embrace lumber and wood pulp along the rivers; furniture and leather goods, especially gloves and shoes, in Vienna and other cities where labor is plentiful; fine steel wares at Graz and Steyr near the iron ore beds; heavier iron and steel goods near the coal fields; glass at Cheb; porcelain at Varlovy Vary (Carlsbad), where the Bohemian forest originally supplied fuel; brewing and sugar refining at Plzen (Pilsen) and Praha (Prague), also near the coal fields; finally, linen, woolen, cotton, and silk textiles along the southern slope of the Erzgebirge, especially around Liberec.

This localization of the textile industry was due at first to local supplies of flax and wool, together with water power and a moist climate. It increased through the attraction exercised by skilled labor on employers seeking a new location, and the proximity of coal. Linen goods and, to a lesser extent, other textiles are still woven in the homes of the people along the banks of the rapid mountain streams.

In the production of pig iron and steel, this section of Europe is at a disadvantage, because coal and iron are not found close together. (Fig. 268.)

To further trade interests there was a complete system of industrial and commercial schools, with a fine commercial museum at Vienna.

419. Commerce. Austria exported manufactures toward the east; Hungary exported agricultural products toward the

17%	16%	13%	9%	7%	6%	4%	28%
Fuel 76 million dollars	Textiles 74	Animal products 62	Sugar 40	Metal m'f'g 31	Grain 30	Glass and pottery 19	All others 132

Data from Consular Repts., Ann., No. 19

Fig. 249. *Exports of Austria-Hungary. Totals in 1907 (millions of dollars): exports, 464; imports, 461, largely foodstuffs and raw materials for Austria; manufactures for Hungary. Commerce was mostly with adjacent countries.*

west. (Fig. 249.) A commercial treaty with foreign countries which benefited the one therefore injured the other. Moreover, Hungary aimed to restrict Austrian commerce in order to develop her own manufactures. Racial antagonism in the Empire was thus reinforced by a deep-seated conflict of economic interests.

The great highways of commerce of the region are the Danube, connected by a shallow canal with the Rhine, and the Elbe-Moldau rivers, navigable for large vessels to Aussig and for small craft to Praha. Canals also connect and shorten the rivers flowing through the Hungarian plain. Owing largely to these water ways, the Adriatic ports handled only about one-third of the foreign trade. American goods frequently reached Vienna through Hamburg.

The main railways of the region radiate from Budapest, Praha, and Vienna, at the center of the principal plains, to the gaps and passes in the inclosing rim of mountains.

Vienna stands near the foot of difficult rapids, where the Danube comes nearest the Adriatic. It is the crossroads of the ancient trade routes, now followed by railways, connecting the North Sea with the Black Sea,[1] and the Baltic with the

[1]Along the Rhine and Danube; also along the Elbe, Danube, and Morava to Constantinople.

Adriatic.[1] Another trade route was opened by the completion of the Arlberg Tunnel,[2] between valleys tributary to the Danube and the Rhine, which forms the eastern gateway to Switzerland and therefore to central and southern France. (Fig. 248.)

Trieste, on a small artificial harbor, by virtue of its position at the head of the Adriatic, the successor of Venice, is now Italian. Fiume, a rival port and an outlet for Yugoslavia is, by the Treaty of Rapallo (1920), an independent state. The mountains descend abruptly to the Adriatic, imposing heavy expenses on railways connecting with Vienna, Budapest,[3] and Zagreb. An Alpine tunnel under the Tauern has, however, opened an easy road from Trieste to southern Germany. Farther south on the Adriatic are the ports of Ragusa and Cattaro (Yugoslavia) now reached by a branch railway system.[4]

420. Bosnia and Herzegovina. Bosnia and Herzegovina formerly Turkish possessions, annexed by Austria-Hungary (1908), now form part of the Serb-Croat-Slovene State. The ruling class there is still Mohammedan, being descended from Christian renegades who changed their religion after the Turkish conquest to save their estates. The exports are chiefly lumber, animal products, and plums. By the acquisition of these provinces, Austria advanced more than half way to Saloniki and there is every evidence that this acquisition only whetted her appetite. At all events, driven by commercial interest she tried to become what her name (Oesterreich) implies—the Empire of the East.

Liechtenstein is a purely agricultural principality lying between Austria and Switzerland. It was included in the Austro-Hungarian Customs Union and administered from Vienna, though nominally independent.

[1]Through the Moravian Gate (950 feet) and Semmering Tunnel (elevation 2,970 feet). Railways also reach Italy by the Enns-Brenner (4,470 feet) and the Pontebba routes. The new railway under the Tauern crosses the divide at 3,999 feet elevation.

[2]Elevation 4,300 feet, length 6.37 miles.

[3]Over the Adelsberg Pass.

[4]Following the Narenta Gorge. The Bay of Gravosa, near Ragusa, is likely to become an important commercial port on the Dalmatian coast.

421. Switzerland. Two voices Freedom hath:

"One is of the sea,
One of the mountains; each a mighty Voice."—Wordsworth.

The words of the poet are nowhere more strikingly illustrated than in republican Switzerland, divided in language (German, French, Italian) and in religion, but fused into one nation by the power of the mountains. From a confederacy of three states or cantons (1291) it has grown to twenty-two, forming without doubt the best governed republic in the world.

As respects surface, Switzerland consists of the Alps in the southeast, the Jura ridges in the northwest, and between these two uplands a plateau of moderate elevation (1,500 feet) extending from Lake of Geneva to Lake of Constance. (Fig. 250.) This plateau contains most of the population and all of the important cities.

422. Natural Resources of Switzerland. The forests are largely cut away, causing avalanches and destructive erosion

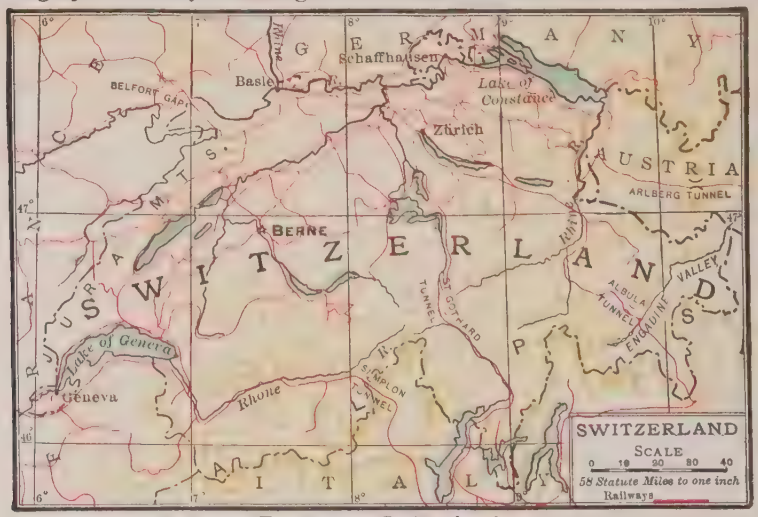


FIG. 250. *Switzerland.*

of the soil, besides the necessity of importing lumber. In recent years, however, serious attempts have been made to reforest the denuded slopes.

Between the timber line and the snow line (6,000–9,000 feet) is the zone of summer pastures, where the herds are driven upward as summer advances and downward as fall draws near. In winter they are fed on hay and fodder grown in the valleys. The country is thus pastoral rather than agricultural. Cheese, condensed milk, and chocolate, in which milk is one ingredient, are consequently very important exports. The railways, by furnishing a market for dairy products, have immensely increased the value of these mountain pastures.

The unproductive heights above the snow line have also become highly profitable by reason of the scenery. Switzer-

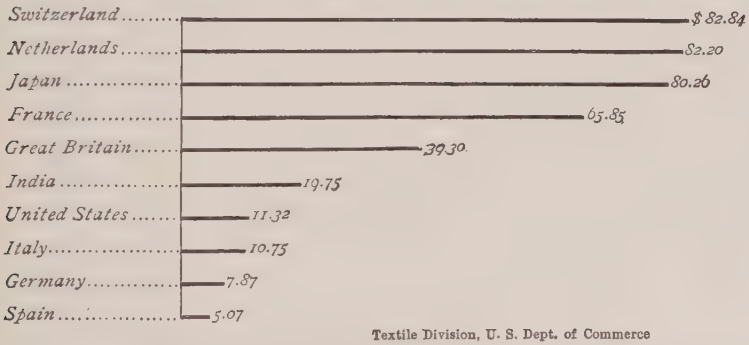


FIG. 251. *Exports of cotton goods per spindle. The figures indicate the relation between the production and the export of cotton goods, not the relative amount of cotton goods manufactured. (Compare Fig. 279.) Value of cotton goods abnormally high.*

land is "the playground of Europe." Some three million visitors are registered there annually, supporting over 1,800 hotels and leaving many millions of dollars in the country. This source of income largely explains the continued excess of Swiss imports over the exports.

Below 2,500 feet the soil is generally cultivated, though much food must be imported. A considerable acreage is under fruits, as well as grains, and bee keeping is consequently important.

Switzerland is poor in minerals, producing only a little asphaltum, salt, iron, and a very little coal. The scarcity of

coal is a desperately serious matter, but it is in part offset by the abundance of water power, which the lakes and glaciers maintain at all seasons.

423. **Manufactures of Switzerland.** For centuries the Swiss were the most valued mercenary troops in Europe, earning thus the livelihood which their mountain home denied them. The Swiss now emigrate to some extent as artisans, but for the most part they are supported at home by manufactures.

The poverty of the people early drove them to house industries and these are now receiving new life from electricity which can be readily distributed to the homes of the workers. Switzerland has thus largely escaped the hideous factory towns and crowded tenement-house districts which disfigure other manufacturing countries. Notable hand manufactures are straw plaiting in the Italian districts, and wood carving in the remote mountain villages.

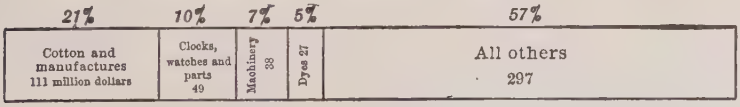
Swiss manufactures in general demand little raw material but much skilled labor, and have in consequence a large value with small bulk. This explains how they can be marketed in every corner of the earth. The most important are fine cotton goods (Fig. 251) around Zürich, especially trimmings and machine embroideries; silk ribbons at Basle; watches and clocks, now made by machinery, in the barren Jura; leather goods, especially shoes, at Geneva; finally, chemical and metal industries in the north, which is more accessible to coal and iron from abroad. Thus aniline dyes are a specialty at Basle, aluminum at Schaffhausen, and fine machinery in the Zurich district.

The prosperity of manufactures in Switzerland is an example of what man can accomplish with but slight aid from nature. It is due partly to water power, but quite as much to the people who have supplemented by intelligence, energy, and thrift the slender gifts of nature. Thus they have established a splendid system of industrial and commercial education, culminating in the great Federal Polytechnicum at Zürich and seven higher Schools of Commerce.

424. The Commerce of Switzerland. Switzerland is, as Dubois tersely says, "badly endowed but well situated." Three of the principal countries of Europe corner on the Alps, each with a great river flowing from this common center. These river valleys form natural trade routes.

Switzerland, however, lacks seacoast and large navigable rivers; and it has no natural exits except by the Rhone and Rhine gorges, by ferry across Lake of Constance, or by difficult mountain passes. Immense labor in building highways, bridges, railways, and tunnels has, therefore, been necessary. Nevertheless, in proportion to its size, Switzerland now ranks near the top in railway mileage. (Fig. 289.)

Since prehistoric days, when the lakes were fringed with villages built on piles, the Swiss lakes have been the active centers of Swiss life. Geneva, on the lake of the same name, near the gap between the Jura and the Alps, with railways down the Rhone Valley to Marseille and into Italy by the Mont Cenis and Simplon tunnels, is the natural commercial center of the south. Basle in like manner commands the Rhine Valley and the Belfort Gap toward Paris. From Basle a direct line leads through the Loetschberg Tunnel to the Simplon and Italy. Finally Zürich, the metropolis, stands where the Berlin-Genoa line through the St. Gothard Tunnel crosses the Paris-Vienna line through the Belfort Gap, the Arlberg Tunnel, and the Engadine Valley.[1]



Data from U. S. Commerce Reports

FIG. 252. *Exports of Switzerland. Total, three-year averages (millions of dollars): exports, 522, largely to France, Germany, and Great Britain; imports, 619, chiefly foodstuffs and raw materials.*

In view of its industries, Switzerland naturally exports chiefly textiles and other manufactures, besides dairy products, but imports foodstuffs and raw materials. (Fig. 252.)

[1] The Albula Tunnel (4.3 miles) opened (1903) another gateway between tributaries of the upper Rhine and upper Danube (Engadine Valley).

425. The French Nation. The French people are generally conceded to be among the most patriotic and united in Europe. They have an artistic instinct which imparts beauty to whatever they touch, and great thrift which enables them to prosper in spite of a huge standing army, a public debt without parallel, and enormous taxes. But they are prone to invest their money in government bonds rather than industrial enterprises, and to educate their children for government positions rather than for independent careers. Trade, moreover, apparently stands in something of the same ill repute as before the Revolution, when nobles were forbidden to engage in it.

426. Surface and Climate of France. France (Fig. 253), only a third larger than California, has almost as great a variety of soil and climate as the whole United States.

The south and east are rugged; the northwestern half lies in the great European plain. A tongue of lowland also penetrates between the uplands of Brittany and the Central Plateau, as far as the Pyrenees. South of Bordeaux this lowland has been invaded by the devastating march of sand dunes, driven by the west wind; but these have finally been checked by planted forests.

Paris is farther north than Duluth, and all France farther north than Chicago; but France, lying open to the west winds from the Atlantic, has a mild, moist climate like our own Pacific coast from San Francisco to Seattle. (Fig. 57.) The Mediterranean slope, however, is subtropical, especially around Nice, which is sheltered from north winds by the mountains (§52).

427. Forest and Animal Products in France. The spreading forests which Cæsar found in Gaul, in whose depths the Druids performed their mysterious rites, survive only in scattered patches. Timber is consequently an article of import.

The uplands pasture many sheep and, in the dry southeast, also goats which maintain the kid-glove industry of Grenoble. Swine are numerous in the chestnut groves which clothe the hillsides at moderate elevations. In the northwest, where the rains from the west winds maintain abundant pasturage, cattle and horses are extensively raised for market. This

FIG. 253. *France.*

district likewise produces dairy and poultry products for export to England. France is also an important honey-producing country, especially around Narbonne.

The Norman breed of horses, which formerly bore the heavily-armored knights through the desperate hand-to-hand

encounters of the Middle Ages, now furnishes fine draft animals, as well as the best cavalry and artillery horses.[1]

428. Crop Products of France. France is before all else an agricultural country. In fruit and flowers France holds first rank, producing all temperate and nearly all southern varieties in profusion. Commercially important are the vine which thrives on warm, south-facing slopes; apples and pears grown for cider along the English Channel; prunes around Bordeaux; olives and walnuts on the Mediterranean slope; flowers for the preparation of perfumes around Nice; citrons in Corsica. Brandy is distilled from wine at Cognac; alcohol for industrial purposes is made from potatoes, beets, molasses, and cider chiefly in the north.

In the production of wheat France was exceeded, in Europe, only by Russia. (Fig. 43.) The other important cereals are oats in the north, corn in the south, rye and buckwheat on the uplands. Along the English Channel, however, cereals have been abandoned in favor of early potatoes and other vegetables and berries, which reach the London market by special boats and trains. Other French specialties are mushrooms and truffles, the latter appearing spontaneously near a variety of oak in the region tributary to Bordeaux. Vegetables, like fish and fruit, are extensively tinned for export. These command high prices because of superior preparation.

The principal industrial crop is the sugar beet. This was introduced by Napoleon I in the hope of rendering France independent of the British West Indies which were at that time the chief source of cane sugar. Sugar beets are now extensively grown on the Anzin coal field near the Belgian border. Other important industrial products, though more or less decadent by reason of foreign competition, are raw silk in the Rhone Valley, flax and hemp in northern and western France, tobacco (a government monopoly) around Toulouse, oil seeds (colza) and dyestuffs (madder, saffron) in various districts

[1] Shaler, *Domesticated Animals.*

Taken all in all, France is by nature the richest agricultural country in Europe; but owing to the small size of farms the methods of agriculture are in some districts incredibly crude.[1]

429. Other Natural Resources of France. France is second only to England, among the European nations, in her fisheries. This industry is subsidized by the government in order to provide seamen for the navy. Its chief seat is Brittany, where the rocky soil and broken coast line resemble our own New England. Nantes, however, is the commercial center of the sardine fishery, and the Arcachon lagoon, near Bordeaux, of oyster culture. (Fig. 256.)

With the restoration of Alsace-Lorraine and the control of parts of the Saar basin, France is now rich in many minerals. It is, indeed, the largest producer of bauxite (an ore of aluminum), asphaltum and, next to the United States, of gypsum; and is also an important source of antimony and phosphate rock. Previous to the World War, France had only limited quantities of the great industrial metals (iron, copper, zinc, lead) and of mineral fuels. (Fig. 138.) Coal, indeed, occurs in the north of old France and in a belt surrounding the Central Plateau; but here only in Le Creusot district does it lie near iron ore. These coal beds are, moreover, small, deep-lying, often highly tilted, and therefore expensive to work.

France, however, possesses immense reserves of power in her mountain streams. The glaciers are mines of "white coal" which, unlike the product of the earth, does not waste away in the using but renews itself from year to year. Already a French industrial district has sprung up in the heart of the Alps.

430. The Manufactures of France. French export manufactures are, like the Swiss, mainly such as have a relatively large value in small bulk. Artistic design, multiplying

[1] "The plows and harrows, with few exceptions, are of primitive style; grass is cut only with scythes and grain with sickles; raking is done with hand rakes; seeds are sown broadcast; threshing is accomplished by small hand flails, or in some cases by tramping; and winnowing is often effected by a rustic sieve and a fresh breeze." (*Commercial Relations of the U. S.*, 1902.) This description, however, does not apply to the richer and more progressive districts.

manyfold the value of the product, is the true basis of French manufacturing prosperity. The first place is held by textiles, including silks, especially fine hand-woven goods at Lyon, and ribbons at St. Étienne; woolens around Roubaix, near coal and accessible to Argentine wool; worsted goods at Reims, among the sheep walks of Champagne; cottons on the lower Seine, especially at Rouen which uses American cotton and British coal, and also along the foot of the Vosges, which afford water power; linen at Lille in the principal flax district; hemp at Havre and jute at Dunkirk, where the imported materials are landed; finally, machine-made lace at Calais.

The mineral industries are naturally found near the coal fields. Examples are iron manufactures at Le Creusot and St. Etienne; glass at St. Etienne and Anzin; porcelain at Limoges, where pure kaolin lies close to coal. Fine wares are also produced in other districts where the trade has been long established, notably Sévres china, St. Gobain mirrors, Nancy hardware, Besançon watches. A recent industry of great importance is the manufacture of automobiles.

Other articles largely exported are leather goods, fine paper, soap, and candles. These are manufactured on a large scale at Marseille, the world's greatest market for oil seeds.

Fully a fourth of the manufactures of France come from Paris, including articles of art and luxury such as bronze goods, jewelry, elegant furniture, carpets, Gobelin tapestries, shoes, dresses, and millinery. For this reason Paris is the Mecca of women the world over.

431. Trade Routes and Centers of France. The rivers of France, radiating from the Central Plateau, cause the routes of trade and travel to converge and cross. This fact has favored the political and commercial unity of France. The larger rivers are generally navigable, though the Rhone is too swift and the Loire too fluctuating for regular use. The rivers are, moreover, linked together, and connected with the Rhine, by an extensive system of canals operated in part by steam

and electric traction. Boats can pass from Havre or Bordeaux to Marseille; cotton is carried by canal to the foot of the Vosges. The internal water ways move about a fourth of the total tonnage. (Fig. 253.)

The great national highways, almost deserted after railways were built, have been restored to honor and commercial usefulness by the automobile.

The railways radiate mainly from Paris to the seaports and frontiers. An immense transit trade from England and Belgium crosses the "French Peninsula" by way of the Seine or

Courtesy of the Northwestern Miller

FIG. 254. *Part of the water front in the port of Marseille.*

Garonne and the Rhone valleys to Marseille. The railways across the land frontiers are also of international importance,[1]

[1] The principal international lines are: Paris-Berlin, along the edge of the great European plain; Paris-Vienna, one going by Severn Pass in the Vosges and the Danube (Orient Express route), another by Belfort Gap and the Arlberg Tunnel; Paris-Turin through the Mont Cenis Tunnel; Paris-Milan through the Simplon Tunnel; Marseille-Genoa along the coast; one into Spain through the tunnel leading toward Saragossa, and two past the ends of the Pyrenees. Another from Toulouse through the Pyrenees, provided for by treaty, will render Barcelona commercially a French seaport.

especially those connecting Paris with Berlin and Petrograd, Vienna and Constantinople, Milan, Madrid, and Lisbon.

The French coast is flat and devoid of natural harbors, other than river ports, except in the peninsulas of Brittany and Toulon. The principal seaport is Marseille near the mouth of the Rhone. (Fig. 254.) This is the outlet of France toward Africa, Asia, the Suez Canal and the French colonies. Havre, the port of Paris, is the sea-gate of France toward America, importing chiefly cotton, coffee, and other tropical products. Part of its trade has, however, migrated up stream with the deepening of the Seine to Rouen (twenty-two feet) and Paris (ten feet). Dunkirk, being nearest the Roubaix textile district, is third in value of goods handled and is

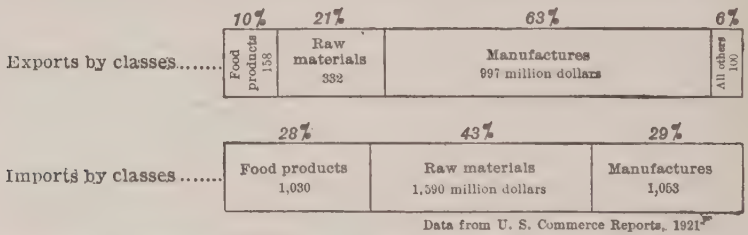


FIG. 255. *Commerce of France. Totals, two-year averages (millions of dollars): exports, 1,587, largely to Great Britain, Belgium, United States; imports, 3,673, largely from Great Britain, United States, and Argentina.*

growing rapidly. It imports chiefly wool and jute. The trade of southwestern France is divided between Bordeaux, the principal port for French wines and olive oil, with its out-port Pauillac; Nantes, which has secured fairly deep water by a ship canal, with its out-port, St. Nazaire; and the ancient Huguenot stronghold, La Rochelle (La Pallice). The ferry-ports on the English Channel are chiefly Calais, Boulogne, and Dieppe.

France lies nearly in the middle of the land hemisphere, fronting the three most-frequented seas. Its sea ways to eastern Europe, Asia, Africa, and South America are shorter, while to North America they are little longer, than those of

Great Britain. So far as position is concerned, France is, therefore, even better placed for commerce than is Great Britain.

432. The Character of French Commerce. Despite its position and transportation facilities, however, France is almost stationary in population and commerce (Fig. 255), while the merchant marine depends on government bounties. The reason is partly the crushing burden of taxes, but largely the character of French industry.

France exports, for the most part, manufactured goods which are articles of luxury, importing in return raw materials and certain classes of foodstuffs. The market for luxuries in prosperous times is fairly steady, and the rich will always buy them; but it is limited compared to the market for necessities. French vessels, moreover, lacking bulky outgoing cargoes, are unable to compete on even terms with British ships. For these reasons France, though prosperous, has been unable to contend for commercial supremacy against those nations which, being better endowed with coal and iron, were able to manufacture for the millions.

433. France Beyond the Sea. To make good the loss of Alsace-Lorraine (1871) and offset in some measure the lack of more land and coal at home, France acquired a new colonial empire second only to that of England.

In Europe France has only a share in the protectorate over Andorra and a virtual protectorate over the small principality of Monaco—the gambling den of Europe. Corsica, though Italian in speech, has been incorporated with France.

The principal possessions of France are the bulk of West Africa (from Algeria to the Congo), Madagascar, and Indo-China. These French colonies are larger than the United States and have a population exceeding 60,000,000. Their annual cost to France, though large, is decreasing; their resources, on the other hand, show a rapid increase. In several, the language and institutions of France have struck firm root; and no one who has ever visited Quebec doubts that the French race has some remarkable staying qualities.

XXXI—GREAT BRITAIN AND IRELAND

"No commerce enriches a nation like the commerce of the sea."

434. Great Britain and Ireland. Great Britain though beset by powerful rivals, is still the greatest commercial nation in the world. (Fig. 238.)

The British people, compounded of Celt, Anglo-Saxon, Dane, and Norman, have long been distinguished for independence, energy, and tenacity; and the British government, though a monarchy in name, is singularly responsive to the popular will. Neither king nor lords dare long oppose any policy supported by a substantial majority of the Commons.

The islands lie farther north than the United States, Glasgow nearly in the latitude of Sitka. The climate is mild and moist, however, owing to the Atlantic and the prevailing west winds. This climate favors moderate but sustained activity of body and mind. Field work, moreover, is seldom interrupted by winter, or navigation by ice, though grain sometimes fails to ripen because of cloudy weather.

The mountains, continuations of the Scandinavian system, traverse the north and west, while the east and south are severed portions of the north European plain. The larger island, therefore, faces commercially toward the continent and the Orient. Ireland on the other hand—a saucer-shaped plain with a broken mountain rim—"turns its back on England," as its main river, the Shannon, enters the sea on the west.

435. Products of the Soil. No other great nation is so dependent on other lands for food. If the supplies from over-sea were interrupted, Great Britain would starve in less than six months.

The moist climate favors grass and roots rather than grain. The mountains and southern chalk hills or downs are also poor

in soil. The country is thus by nature pastoral rather than agricultural; in the Middle Ages it was the chief wool-producing country in Europe. Moreover, since the repeal of the tax on imported grain (1849), grass has rapidly gained on the plow lands; and by reason of Australian and Argentinian competition, even the grazing industry has somewhat declined, much land especially in the highlands being abandoned to grouse and deer. Cattle are, however, fairly numerous on the damper western slopes, sheep on the drier hills or downs of the south and east, while the Channel Islands are noted for fine breeds of dairy cattle, notably Jerseys. Ireland, the "Emerald Isle" where the pasturage is unfailing, ships butter and bacon to England.

Forests have practically disappeared, except in pleasure parks and game preserves.

The land is mostly held in great estates, and worked by tenants who pay fixed cash rentals. Having a right to whatever they produce in excess of the rent, they farm the land very intensively. The crops are chiefly oats and potatoes; with barley, wheat, and fruits toward the east and south; flax in the north of Ireland, early vegetables in the Channel and Scilly islands.

436. The Fisheries of Great Britain and Ireland. A general elevation of 600 feet would again carry the edge of the continent far beyond Ireland. This immense expanse of shallow water surrounding these islands serves as the feeding and spawning ground of myriads of fish. (Fig. 256.) Great Britain is thus, by virtue of its position, the greatest fishing nation in Europe.

Fish that "school" and approach the surface, such as mackerel, herring, and sardines, are taken either in seines or drift nets. Ground fish such as cod are still taken on hand lines inshore, and halibut by this method everywhere; but deep-sea fishing is mostly with trawl nets, usually one hundred by fifty by four feet in size, which are dragged along the sea bottom at night, sometimes bringing up five tons of fish at a haul. The

fishing vessels, both "liners" and "trawlers," are now largely propelled by steam. Being equipped with ice, and wells through which the sea water circulates, they bring fresh fish—even live fish—from the Faeroes and Iceland, where the largest catches are now made.

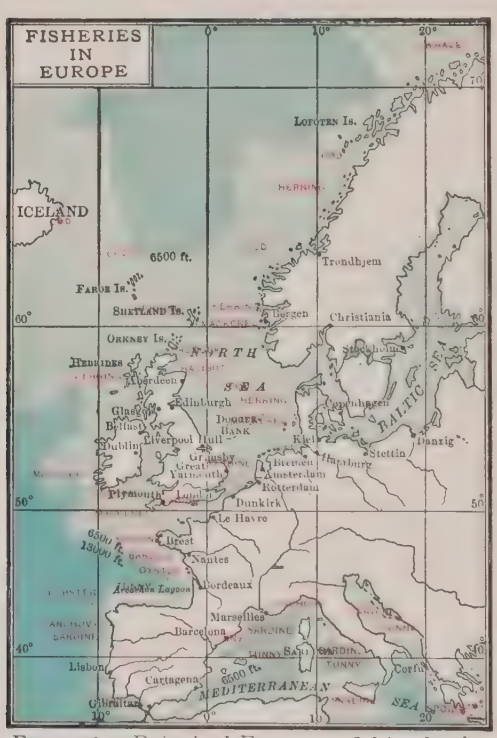


FIG. 256. *Principal European fishing banks.*

The use of larger vessels and of steam has concentrated the fishing industry in a few ports having excellent railway connections; notably Plymouth in the south, Great Yarmouth and Grimsby in the east, and Aberdeen in Scotland. Grimsby, near the Dogger Bank, has thus become the greatest fishing port in the world.

The seamen bred in the fisheries are the main factor, next to coal and iron, in maintaining the British merchant marine—the real backbone of British commercial supremacy.

437. Mineral Resources. The tin of Cornwall drew the Phœnicians to the island of Britain several thousand years before the Christian era. These tin mines are still in operation, though the adjacent copper veins are practically exhausted. There is also a considerable output of lead and zinc in Wales, and of iron ore chiefly around Middlesbrough and

Barrow-in-Furness. Much iron ore, however, is imported from Spain and Sweden to feed the British furnaces.

The true wealth of Britain is in her coal beds, which constitute her "Black Indies," richer by far than the India of Clive and Hastings. The coal fields lie chiefly on the flanks of the Pennine Range, which forms the principal divide in England; in southern Wales, where the coal is largely anthracite; and in the lowlands of Scotland. (Fig. 238.) Ireland has only a very little coal of inferior quality, and largely uses peat for fuel. Lack of coal is the great economic defect of Ireland, as of Italy. The British coal fields exceed in area those of all the rest of Europe outside of Russia.

438. The Rise of Manufactures in Great Britain and Ireland. Throughout the Middle Ages, Great Britain was almost exclusively a pastoral and agricultural country. At the close of that period, the extension of sheep runs, driving many tenants from the soil, helped to plant the English race in America.

Manufactures profited from the immigration of skilled artisans from France during the religious wars of the sixteenth century, and still more from England's conquest of a vast colonial empire during the seventeenth and eighteenth centuries. The demand for manufactured goods in these colonies doubtless had some connection with the series of great inventions in England—for example, the spinning jenny and power loom—which have revolutionized the industry of the world. They gave Great Britain a practical monopoly of production by machinery; and this monopoly was confirmed for more than a century by the use of steam, owing to the wealth of Great Britain in coal and iron. Napoleon I forbade trade with England, but was driven to violate his own edict in order to clothe his army. Only within the last generation has any nation been able seriously to compete with England in machine-made goods.

439. The Textile Industry. The textile industry was the first, and is still the most important, branch of manufactures. (Fig. 279.) Wool is woven chiefly on the eastern slope of

the Pennine Range, at Bradford and Leeds and also in Scotland, both being sheep-raising districts containing large coal fields; cotton in the west around Manchester over another coal field, where the climate is moist (which decreases the breakages of thread in the processes of manufacture) and where American cotton is easily accessible. Linen, again, is worked at Belfast in the flax-growing region; linen products (shirts, collars, cuffs) not far away at Londonderry; and silk in the midlands at Derby, where the water is suitable for dyeing. Dundee, being favorably located for getting flax from the Baltic, formerly manufactured linen almost exclusively, but turned to jute when the supply of Russian flax was cut off by the Crimean War (1854–56) and is now the principal center of jute manufacture in Europe. (Fig. 225.) In Ireland and the northern islands homespun cloth is still woven on hand looms. Finally, some localizations of industry are apparently due merely to an early start and acquired momentum—for example, the manufacture of carpets at Kidderminster and Wilton and the manufacture of lace and hosiery at Nottingham.

440. Grain and Sugar Industries. Other industries employing agricultural materials are the distillation of barley whisky in Scotland and Ireland, where considerable barley is grown; flour milling at Liverpool, where American wheat is landed; and sugar refining in all the principal ports which receive cargoes of raw sugar. The development of flour milling in west England, despite the damp climate (which renders more difficult the production of high-grade flour) has been sufficient to decrease the imports of American flour. It is no doubt due to the fact that Liverpool is the greatest market in the world for wheat, receiving supplies at all seasons.

441. Mineral Industries. The iron industry began near great forests which furnished charcoal, but now persists only where coal is available. Blast furnaces for the smelting of ore are found chiefly in the Middlesbrough and Barrow-in-Furness districts, containing both coal and iron, and on the south Wales coal field, where Spanish ore is smelted.

Birmingham, near the ancient forest of Arden, is, however, the principal hardware center. From Birmingham west stretches the "Black Country," shrouded with smoke by day and lit with flashes of fire by night from the countless iron works. Sheffield specializes in cutlery, having excellent sandstone for grinding. Ship building centers chiefly on the Clyde at Glasgow, and at Newcastle-on-Tyne and Belfast, all having easy access to coal and iron. Belfast indeed obtains coal by sea more cheaply than inland towns within fifty miles of the coal fields. Other metals — tin, lead, zinc, copper — are smelted at Swansea, near the Welsh coal field and accessible to the tin of Cornwall, though the ores are now mostly imported.

Glass and pottery are also made on the coal fields: glass at Birmingham and St. Helens; porcelain at Derby, Worcester, and in the district around Stoke-upon-Trent, called "The Potteries." Chemical works are found chiefly in the seaports, accessible to imported materials.

442. Situation and Transportation Facilities. To the ancients, Britain lay at the edge of the world, bordered by the unknown "Sea of Darkness." The voyage of Columbus suddenly placed it in the center of the world. America was thus the making of England. Moreover, the "silver thread" of the Channel, preventing invasion by land, left England unburdened by a great standing army, and therefore free to seek her fortune on the ocean. This advantage more than offset the even more central location of France.

The coast line, deeply indented by estuaries and bays, favors maritime pursuits. Moreover, the high tides carry navigable depths well up the rivers.

The rivers are connected by an extensive network of canals built during the two generations (1765–1830) before the introduction of railroads; but most of them are navigable only by small canal boats and many are controlled by railroads, which naturally permit no competition. The proportion of freight moved by water is thus only a fifth as large in Great Britain as

in France. The Manchester Ship Canal,[1] however, renders Manchester a seaport independent of Liverpool, and from it lines of steamships now sail to many parts of the world. It already ranks high among British seaports. Such is the superiority of ocean transportation that the migration of industries to salt water, noticeable in various countries, can only be checked by thus, in effect, bringing the sea inland.

The British highways are admirable, in striking contrast to their condition in the eighteenth century; and the railways, encountering few heavy grades, bring practically every part of the larger island within twelve hours of London. In Ireland the lines radiate from Dublin, which commands the principal eastern entrance to the central plain.

443. Seaports of Great Britain. The leading commercial ports are on the rivers which enter the sea nearly opposite each other, thus bringing the ports near together, for example, those on the Clyde and Forth, Mersey and The Humber, Thames and Severn.

London, the metropolis, banking center, and long the greatest seaport of the world, was originally a Roman camp on the first hill encountered in ascending the river. This was a convenient point for crossing—at first by ferry, later by bridge. London Bridge was thus in a sense the cause of London. The stupendous growth of London resulted from its position opposite the mouths of the Rhine and Meuse, at the natural gateway of southern England, and from its distributing trade in oriental wares before the Suez Canal was opened. It is still the principal world market for tea and wine. The largest ships, however, are now compelled to stop at Tilbury Docks, far below the city; and the great continental ports of the Americas and Europe have outstripped London in tonnage. (Fig. 291.)

Other leading ports are Cardiff (with Barry Docks) on the Severn, exporting anthracite; Liverpool on the Mersey, the emporium for American and West African trade, especially

[1]Length thirty-five and one-half miles; depth twenty-eight feet.

land, alone made possible its political independence. Holland, or the Netherlands, as it is officially known as a nation, is thus the product of the ocean, as Switzerland is of the Alps.

Belgium, on the other hand, lacking natural boundaries in all directions, has always been a debatable land. No equal area is so sown with battlefields. The larger part of the population to the north is Dutch (Flemish) in speech, while the population of the southern hill country is French. The linguistic boundary which is rather sharply marked, runs approximately from Courtrai past the historic field of Waterloo to Verviers. (Fig. 229.)

454. Natural Resources of the Low Countries. Patches of forests exist on the broken Ardennes Plateau in southeastern Belgium; but timber is a large import both in Holland and Belgium.

Much of the land is under grass. The drier east pastures sheep, the low-lying west pastures dairy cattle and draft horses. Belgian horses are largely exported. In Belgium, where less than half the farms contain as much as two and a half acres each, pigs, poultry, rabbits, and draft dogs[1] are also important.

The land being so subdivided, agriculture is a matter for the spade rather than the plow.

The staple foods are rye and potatoes, though other grains are also sown. Immense quantities of vegetables and flowers are raised under glass. From parts of Holland, special cabbage, cucumber, and meat trains are run to the seaports for the London market. Sugar beets are extensively grown in both Holland and Belgium. Other industrial crops comprise the finest flax in the Lys Valley, tobacco near Courtrai, chicory in the Bruges district, and oil seeds (colza, rape) around Ghent. Chicory is a root which came into use during the wars of Napoleon as a substitute for coffee.

The Dutch began their career on the sea as fishermen, and fishing is still a great primary industry of the Netherlands.

[1]See Ouida's *Dog of Flanders.*

The hilly district in southern Belgium is rich in minerals; notably iron at Liège, zinc at Moresnet, silver-lead at Verviers, coal around Mons, Charleroi, and Liège. By reason of these resources, which support manufactures, Belgium is the most densely-populated country in Europe, and the immigration has always exceeded the emigration. (Fig. 240.)

455. Manufactures of the Low Countries. The Netherlands, having neither coal nor water power, has few manufactures. Those of large commercial importance are chiefly pottery at Delft, diamond polishing at Amsterdam, paper along the Zaan River, and the preparation of colonial wares such as chocolate, quinine, and tobacco. The steady winds furnish considerable power for drainage and local industries.

Belgium, on the other hand, is once more the greatest hive of industry on the mainland of Europe, as it was during the Middle Ages. The linen industry flourishes along the river Lys, where the water, being free from lime salts, is peculiarly adapted for retting flax—that is, separating the fiber from the stalk. Ghent in the flax-growing lowlands is the center of linen manufacture, and also of cotton, hemp, and jute manufactures; while Verviers on the sheep-raising Ardennes Plateau is the center of woolen, and Brussels of carpet and lace manufacture. Belgium is the greatest lace-manufacturing country in the world. The mineral manufactures are naturally located on the Belgian coal fields. The Liège field contains many zinc smelters. Seraing, a suburb of Liège, has rivaled Le Creusot and Birmingham in steel. Firearms are another specialty of this district. Charleroi is noted for glass, in which Belgium has held first place, and Jemappes for pottery.

456. Trade Routes and Centers of the Low Countries. The Netherlands has a superb system of water ways, both natural and artificial; Belgium leads the world in railway mileage relative to area. (Fig. 289.) The coast, however, is sandy and the sea shallow far out, while the rivers require such constant dredging that most of the Belgian-Dutch ports now rely on ship canals.

The old commercial center of Holland was Amsterdam near the head of the Zuider Zee. It has a ship canal to the North Sea, and numerous other canals to the Rhine and into Belgium.[1] Owing to the Dutch East Indies, Amsterdam is the first coffee market in the world and next to London the largest market for all other East India products. Up to 1914 Rotterdam on the northern mouth of the Rhine handled an enormous transit trade. Over a hundred forty thousand river and canal boats entered yearly. It is, in fact, the natural seaport of the whole Rhine Valley and has superseded Amsterdam as the chief commercial city. Fast passenger traffic between London and Berlin goes by way of Flushing.

The commercial center of Belgium is Antwerp, lying some miles up the Scheldt but accessible to the largest vessels. It is also connected by canals with the Seine and the Rhine, besides the industrial centers of Liège and Charleroi. Antwerp has come to the front with great rapidity and now ranks among leading European ports in tonnage entered and cleared.[2] (Fig. 291.) Bruges, which was the entrepôt of Venetian trade in the fourteenth century, has again secured a ship canal to the sea,[3] as has also its ancient rival, Ghent.[4] Heyst (Zeebrügge) is a new outport of Bruges at the mouth of the canal, but passenger traffic still goes by way of Ostend.

457. The Commerce of the Low Countries. During the seventeenth century the Netherlands held the commercial supremacy in Europe. In proportion to population, the Low Countries still have the largest foreign commerce. (Table 4.) This is the result not only of their position and facilities for transportation, but also of the character and

[1]The North Sea Canal, fifteen miles long and thirty-three feet deep; the Merwede Canal, ten and one-half feet, to the Rhine; the South Willems Canal, seven and one-half feet, to Belgium.

[2]Tonnage, however, is not an entirely safe guide to commercial importance. A vessel may stop at an intermediate port without leaving or taking away much freight.

[3]Twenty-six and one-half feet deep, seven miles long.

[4]The Terneuzen Canal, nineteen miles long, now deepened to twenty-eight and one-half feet.

technical education of their inhabitants. There are Schools of Commerce at Amsterdam, Antwerp, and elsewhere; Commercial Museums at Amsterdam and Brussels; and an extensive system of industrial education in Belgium.

In consequence of difference in natural resources, the Netherlands exports largely dairy products, margarine, and mutton, while Belgium exports chiefly manufactures. Both import foodstuffs. In addition, the Netherlands imports manufactured goods, and Belgium imports raw materials.

458. The Colonies of the Low Countries. The Dutch colonies are a legacy from the days when Admiral Van Tromp carried a broom at his masthead as a token that he would sweep from the sea every opposing fleet. These colonies

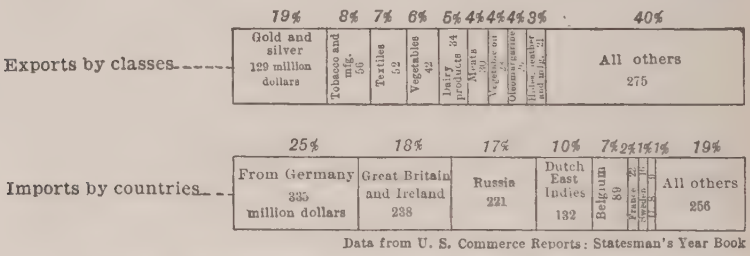


FIG. 264. *The commerce of the Netherlands. Totals in 1919 (millions of dollars): exports, 693; imports, 1,318. These figures include a large transit trade.*

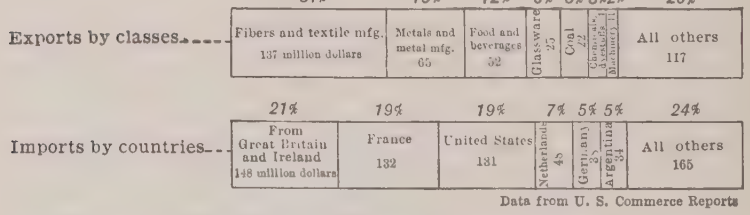


FIG. 265. *The commerce of Belgium. Totals, two-year averages, (millions of dollars): exports, 443; imports, 696.*

embrace most of the East India islands, besides important possessions in the West Indies. They are collectively smaller

than the French colonial empire, but far richer. The Dutch are incontestably the ablest administrators of plantation colonies, as the English are of self-governing colonies.

FIG. 266. *Antwerp, the great distributing point of Belgium and a world market for products from Belgian Congo.*

King Leopold of Belgium, desirous of increasing his private income, organized a company which sent out Stanley to explore the Congo, and then by virtue of his official position got permission from the great nations to organize a sort of independent state. In 1908, however, the Congo State was annexed by Belgium and took the name, Belgian Congo. Through this connection, Antwerp (Fig. 266) has become the principal market in the world for rubber, ivory, and copal gum.

459. The German Nation. After the military triumph over Austria in 1866, as a result of which Prussia succeeded in making itself the head of the German Confederation, an era of industrial and commercial development was inaugurated in Germany under the leadership of Prussia. This era was dominated by the same spirit of conquest and aggrandizement that has characterized Prussian principles since the time of Frederick the Great. Whatever success has resulted has been at bottom due to the thorough technical training guided by the strong hand of the German schoolmaster who has rigorously carried out the teachings laid down by his government.

To accomplish this result, education was made in fact universal; and the thorough system of primary, secondary, and university instruction was supplemented by many technical schools for farmers, artisans, and business men. These special schools were grafted on the trunk of general education, branching off at different elevations. The highest were the great agricultural, technical, commercial, and colonial schools, of true university rank, which trained the captains of German industry and commerce.

The German people, more than any other in modern times, have been trained in an all-embracing "system" which left nothing to chance, and little to the individual, and yet carried into the competition of international commerce the aggressiveness and discipline of the battlefield.

460. The German Government. The German Empire was a confederation of twenty-six states which included kingdoms and principalities large and small, also the three free (republican) city-states of Hamburg, Bremen, and Lübeck—the remnants of the once mighty Hanse. (Fig. 267.) From the American viewpoint, indeed, there was too much government in Germany, and far too much restriction of private

the world. (Fig. 278.) On the upper Rhine the grains are wheat and barley; the industrial crops, tobacco and chicory, with grapes on all the terraced slopes and hops on the Bavarian Plateau. The country roads are commonly lined with plum trees, and nearly every German village is embowered in orchards, although the climate is far less favorable to fruits than in France.

Germany lies too far north for corn, yet some cultivated (inter-tilled) crop is indispensable in the rotation system to keep the soil in good condition. This fact largely explains the importance of potatoes in northern, sugar beets in central, and tobacco, chicory, and hops in southern Germany.

Owing to the dense population of Germany, beet sugar is the only important agricultural export, while foodstuffs, especially wheat, have begun to be largely imported.

464. The Fisheries of Germany. Almost every village has a pond planted with German carp, and the rivers are similarly stocked. Amber, a fossil resin which first drew Greek vessels to the north, is still washed up by the waves along the shore of the Baltic; but the German sea fisheries are relatively unimportant, as the Baltic is brackish and therefore poor in fish and the best fishing grounds in the North Sea are nearer other countries.

465. The Mineral Resources of Germany. The mineral resources of Germany, on the other hand, are abundant and form the physical basis of its industrial and commercial prosperity. The richest mineral belt lies on the flanks of the central uplands which extend with some breaks from Belgium to Russia. The metallic resources are zinc,[1] in which Germany ranks next to the United States; deposits of iron which have been considered the largest in the world; and also considerable copper, silver, and lead.[2] (Fig. 268.) There are several coal fields[3]

[1]Near Aix-la-Chapelle in the west and Königshütte in the east.

[2]At Mansfield in the Harz Mountains and Freiberg in the Erzgebirge (Ore Mountains).

[3]In the Ruhr valley, also on the northern slope of the Erzgebirge. Lignite occurs in central Germany around Hanover.

smaller than those of France but better located with reference to iron ore and water transportation, and therefore far more productive. (Fig. 268.) Finally, Germany possesses abundant deposits of salt, especially in the provinces of Saxony and Hanover, and the principal deposits of potash salts at

Data from Dieroke's Schul-Atlas

FIG. 268. *Coal and iron fields of Central Europe*

Stassfurt. Besides their use on worn-out soils as fertilizers, potash salts are of great value in the chemical industries. In the Danube region, lithographic stone is mined at Solnhofen and graphite at Passau.

466. The Manufactures of Germany. The people of Germany believed that a great truth was embodied in the words "The future of Germany lies upon the ocean." In order to support her rapidly growing population at home, Germany, driven to manufacture for export, became in thirty years (1870–1900) preëminently an industrial and commercial nation whose wares were in every mart and whose ships furrowed every sea.

Domestic industries, such as the manufacture of toys, clocks, and mouth harmonicas, still survive in mountain districts, especially the Black Forest. But the silence of the

thinly-peopled highlands contrasts sharply with the clang of industry in the valleys which penetrate the coal fields.

467. The German Iron and Steel Industry. The leading manufacturing industry of Germany is the working of iron and steel, in which Germany has surpassed Great Britain. (Figs. 269 and 282.) This industry is localized largely in the Rhine industrial district, and the heart of the Rhine district is the Ruhr coal field, which has iron ore in the vicinity and other deposits accessible by water from the Moselle Valley. (Fig. 268.) Leading steel centers are Düsseldorf; Essen, the seat of the great Krupp steel works (Fig. 269); and Solingen, noted for cutlery. Steel ships, however, are naturally built in the seaports, notably Stettin and Kiel, which obtain coal and iron from the upper valley by way of the Oder River.

468. The German Textile Industry. Next in importance is the textile industry. In the Rhine district where imported fibers are easily accessible, the textile centers are Krefeld, ranking next to Lyon in silk; München-Gladbach, noted for cotton goods; and Barmen-Elberfeld, producing mixed textiles and aniline dyes. In the vicinity there are, in addition, Aix-la-Chapelle, the seat of important woolen, and Bielefeld, of linen, manufactures. A second textile district is found in south Ger-

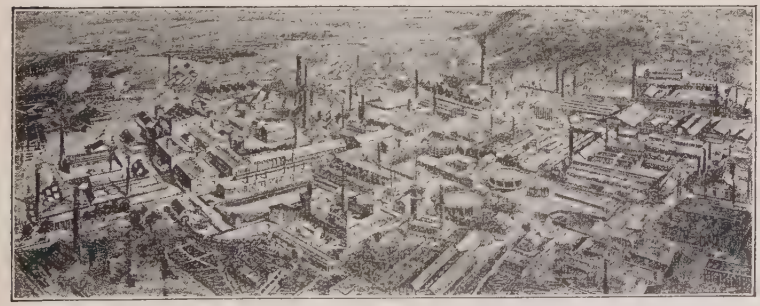


FIG. 269. *Bird's-eye view of the Krupp steel works at Essen.*

many, where water power is of some importance. The leading manufacturing centers are Augsburg and Halle, both producing

cotton goods. A third textile district is associated with the coal fields along the northern flank of the mountains in Saxony. Chemnitz produces chiefly hosiery, besides textile machinery; Zwickau, in a sheep-raising region, has woolen mills; and Zittau, in a flax-growing district, makes linen goods.

469. Other Industries. The industry third in importance was the manufacture of chemicals. In fact, the chemical laboratory was to a great extent the foundation of all German industries, as the machine shop is of American industries. Germany, because of her many expert chemists,[1] enjoyed a practical monopoly in the making of aniline (coal-tar) colors. During the World War American chemical industries did much to supply the deficiency created by the German blockade. The center of the industry is the district from Frankfurt to Mannheim on the upper Rhine.

Among the other important industries are the manufacture of "Dresden" china at Meissen, near deposits of kaolin; furniture at Stuttgart, and jewelry at Pforzheim in the Black Forest; also paper, leather, and rubber goods in many cities. The center of the world's book trade is at Leipzig. Munich, at the falls of the foaming Isar, is noted for beer, which the Germans early learned to brew from hops and barley, and for works of art in wood and marble. Nürnberg, which was the great center of German industry in the Middle Ages, now manufactures toys, pencils, electrical machinery, and whatever else can be made without great expenditure for transportation or fuel.

470. The Position of Germany. Germany was the most central state in Europe, and the country is for the most part without natural boundaries. A great army thus seemed the price of national existence. The sea routes through the English Channel to America or the Orient are not only longer than those of France and England, but they are at the mercy of those nations in case of war.

In a military and naval sense, therefore, the location of

[1]A single factory at Ludwigshafen near Mannheim employed over a hundred expert chemists.

Germany leaves much to be desired; but in a commercial sense it is admirable. This fact, sometimes strangely overlooked, goes far to explain the growth of German commerce. Transportation by sea is far cheaper than transportation by land; hence the longer sea routes of Germany to the New World and the Orient, compared to France or England, are more than offset by her shorter land routes to all central Europe.

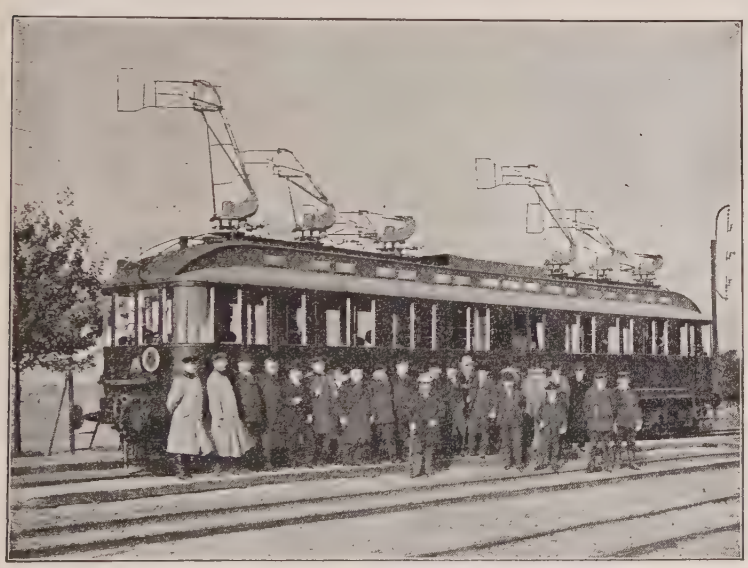


FIG. 270. *Trolley car which made the speed of 130 miles an hour near Berlin.*

471. Transportation Facilities of Germany. The rivers of Germany, in place of flowing from a common center as in France, are in general parallel. Germany thus lacks one element of natural cohesion. The German rivers are, however, navigable for long distances;[1] and the great Midland Canal

[1]The Oder to Kosel for 400-ton vessels; the Rhine to Mannheim for 1,500 tons, Strasbourg for 800 tons, Basle for small vessels; the Danube to Regensburg for large, and Ulm for small vessels; the Elbe and Vistula to beyond the German frontier. The value of the rivers for navigation has been largely increased by reforesting the hills about their headwaters.

System already largely in operation, may ultimately connect all rivers from the Vistula to the Rhine.[1] (Fig. 267.) This canal system is singularly favored by an ancient river valley extending from east to west, where the waters formerly flowed along the edge of a great ice sheet. The German water-ways have increased their tonnage faster than the railways; and the rates by water are much less than the rates by rail. The Elbe and Rhine have by far the largest tonnage. In 1914 the Rhine fleet alone comprised about 10,000 vessels.

The railways mostly belong to the several states, and grant special export rates on German goods. The rates are also arranged so as to direct traffic to German rather than foreign seaports.

The principal railway centers are Berlin (Fig. 270), the most central city in Europe, located in the middle of the North European plain,[2] and Frankfurt (am-Main), which stands like Vienna at the crossing of the Rhine-Danube through line with others connecting the Baltic Sea and the Mediterranean.[3] These Rhine railways are links in the chain of overland communications between England and India.[4] Munich, the gateway of Brenner Pass, is the commercial heir of Augsburg and the other mediæval cities which flourished on the trade between Italy and the north.

472. The Seaports and Fairs of Germany. In proportion to its size, Germany has little seacoast, except on the Baltic, because the outlet of the Rhine and the adjacent coast are controlled by foreign states.

[1]To carry 400 tons east and 800 tons west of the Oder. The capacity on the southern canals at present is only 110 tons on the Ludwig Canal (four feet) between the Rhine and Danube; and 200 tons on the Rhine-Rhone and Rhine-Seine canals, the latter passing the Vosges by a tunnel at Zabern or Saverne.

[2]Where the following through lines cross: Paris-Petrograd, along the inner edge of the northern plain; London-Vladivostok, Hamburg-Odessa, Copenhagen-Rome (by way of the Brenner Pass).

[3]From Lubeck and Hamburg along the Weser, Rhine, and Rhone to Marseille; or by way of the St. Gothard Tunnel to Genoa.

[4]The Orient Express route from Paris to Constantinople crosses the parallel ridges of the Vosges at Saverne Pass (1,325 feet) and the Black Forest at Pforzheim.

On the Rhine, however, Cologne, which was the most famous port of Germany in the Middle Ages, before the World War again became a seaport for medium-sized vessels (10 feet); and Emden, the cable station for America, secured connection with the Rhine industrial district by the Dortmund-Ems Canal.

On the Weser, Bremen, the second port of Germany, together with its outport, Bremerhaven, handled the bulk of the emigrant traffic and was the principal market for tobacco in the world. It was also the largest market outside of England for cotton and rice.

On the Elbe, although the coast is low and the channel is kept open only by a constant battle with the sand, Hamburg is the natural commercial metropolis of Europe. Lying at the head of the North Sea on the Elbe, which forms a water-way through the mountains into Austria, it commands the ship canal to the Baltic at Kiel. Its public dock and wharfage facilities are among the finest in the world. The outport of Hamburg in winter and for the largest vessels is Cuxhaven.

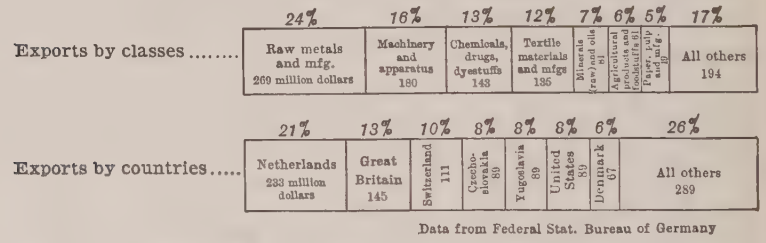
On the Baltic, Lübeck, the ancient head of the Hanse, became once more a busy commercial port by reason of the Elbe-Trave Canal (8½ feet), while Stettin prospered as the Baltic port of Berlin and of the entire Oder Valley. These ports are kept open in winter by ice breakers. Kiel, on a deep fiord-like harbor, is the Baltic terminus of the ship canal leading from the North Sea (46 feet); and was the chief German naval station.

The great fairs of Liepzig, dating from the Middle Ages (1216), still draw together a large concourse of merchants. Leipzig, because of its central location, was at one time the principal market in the world for furs and imported fur skins, wool, and similar animal products. The center of the fur trade, however, has moved eastward to Asia.

473. The Commerce of Germany. The commercial hinterland of Germany embraced, in the first instance, Russia, Austria-Hungary, the Balkan states, and Rumania, These purchased German manufactures in return for food and raw materials. The Bagdad Railway, moreover, was planned to enable German freight cars to reach the Persian Gulf without

unloading. The plans of German commerce were in fact designed to secure the domination of the markets of the entire world, and the German merchant marine was made the advance agent of the German lords of trade and industry. The dense population of Germany increasing at the rate of a million a year, also made it necessary to maintain extensive foreign markets for her manufacturers in order to secure the needed food supply.

The chief rivals of Germany in the commercial world were France and England, in whose vast overseas trade she sought



Data from Federal Stat. Bureau of Germany

FIG. 271. *Commerce of Germany. Totals, 1920 (millions of dollars), exports, 1,112. Imports by classes and countries not available. Imports from United States, 311 million dollars.*

to make deep inroads. Finally, the ambition of her autocratic rulers unsatisfied by the comparatively slow progress in the competition of international commerce, Germany launched the attempt to crush her rivals, France and England, by force of arms. This would not only secure the control of additional territory for commercial and governmental exploitation, but would place her in a position to dominate the world's trade.

474. Luxembourg. Luxembourg, on the Ardennes Plateau, is rich in coal, iron, and zinc.

It is neutral territory—in name at least—by international agreement. It is, however, German-speaking and was included in the German Customs Union and was thus in effect a part of the German Empire, as Liechtenstein was of Austria. Luxembourg is now included in the Customs Union of France.

475. The German Colonies. Trade in a measure unquestionably follows the flag. Still more does it follow the language, merchant ship, and custom house. Unfortunately for Germany, however, when Bismarck cast about (1884) for colonies to serve as markets for German manufactures, and lands where the German people might settle under their own flag, he found the Temperate zones already occupied by other nations. The German colonies in East and West Africa and the South Pacific were consequently of the plantation type, not suited to white colonization. Only in Southwest Africa, which is partly temperate, were there a few thousand white people. Kiaochow, though temperate, was densely peopled by Chinese. Finally, the retention of these colonies, which were occupied by England or her allies in the course of the World War, hinged on the outcome of the great struggle and the diplomacy of German representatives at the peace table. With peace Germany's colonial empire of more than 1,000,000 square miles vanished, all rights and titles to her over-sea possessions being renounced in favor of the Allied and Associated Powers.

XXXIV—RUSSIA AND HER FORMER POSSESSIONS

476. Characteristics of Russia. Asia really begins at the eastern frontier of Germany (Fig. 202) as Africa does at the Pyrenees, because Russia in Europe is an undivided part of the great Siberian plain. The ascent of the Urals is so gradual that one may cross the range without seeing a sign of mountains. On the other hand, Russia is distinct in history from western Europe, where civilization was early fostered by the indented coast line and sheltered by the rugged uplands.

The Russian people are consequently Asiatic in character and largely so in blood. Peter the Great trimmed their flowing beards and garments, but could not change their habits of thought. Not far from nine-tenths of the Russian people, excluding the Finns and Poles, are peasants freed (1861) from serfdom. All are still almost entirely illiterate, and till recently their villages (*mirs*) have held the land in common somewhat like the village communities of India.

477. The Russian Government. The government of the Czars has been wittily described as "a despotism tempered by assassination," and its character seems to have been changed but little by the establishment of a Duma or Parliament. The title of Czar is a corruption of Cæsar, Russia thereby having claimed to represent the Eastern Roman Empire, whose seat was Constantinople; but the autocratic power of the Czar really came from the Tatar Khan, to whom Russia was long subject. Russia was in truth the historical successor and heir of the great Asiatic empires—Persian, Parthian, Arabic, Turkish, and Mongol. The revolution of 1917, during the World War, deposed the Czar and since then people's governments of different forms have been in force.

478. The Climate of Russia. Russia, like the United States, has almost every variety of climate and products. The

mountain ranges of Europe, however, presenting their ends to the west winds, create no sagebrush deserts as in America. The moisture is distributed widely over Europe and Asia, decreasing, however, toward the east and south except where the winds encounter highlands. As in the Great Plains region of the United States, Russia, east of longitude 40°, receives most of it during the growing season. The west winds likewise modify the temperature along the Baltic, while extremes increase toward the east. In Siberia 40° F. below zero and 110° F. above zero are both common.

479. Tundra and Forest Belts in Russia. Along the north, both of Europe and Asia, extends a belt of moss-covered tundras supporting only reindeer. It also supplies considerable fossil ivory. Owing to the severe winters, this belt reaches farther south in eastern Siberia. (Fig. 17.)

South of the tundras is a broad belt of forests. This is the principal timber and fur region in the Old World. The maritime provinces in Siberia, indeed, live chiefly by the fur trade. The most valuable furs are the sable, marten, and ermine.

480. The Zone of Mixed Farming in Russia. In southern Finland[1] and from the latitude of Petrograd south in Russia, the forests have been largely felled and mixed farming prevails. Toward the south, most of the land is in cereals. Special butter trains have been run from Ob′ in Siberia to Riga in Latvia and Revel in Esthonia, and special egg trains from the southwestern provinces to Hamburg, to supply the English market. The farming methods are primitive. A crooked stick commonly serves for a plow, a sickle for a reaper, and a hand flail for a threshing machine. The three-field system, used in western Europe during the Middle Ages, long prevailed here, rye being followed by oats or wheat, while the third year the land lay fallow. Over 100 million acres would thus lie unused in Russia every year. Intertilled crops had, however, begun to be substituted for the year of fallow. These were chiefly potatoes along the German border,[2] and sugar beets around

[1] Finland in 1917 declared its independence, which has now been recognized by the leading nations. [2] Now Poland.

Kiev, the capital of Ukrainia. Other industrial crops were flax in the west, and hemp in the drier central districts, both flourishing in the vegetable humus left by the forests. In both crops Russia held first place. (Figs. 272 and 273.)

481. Wheat and Grasslands of Russia. South of a line from Kiev to Kazañ is a region of prairies which extend into western Siberia. Here is the famous "black-earth" district of great fertility; but the southeastern part of it lies in the semi-arid belt and is consequently subject to terrible famines. This district grows most of the wheat for export, though on account of poor tillage the yield per acre of wheat was the lowest

13%	11%	10%	10%	12%	9%	7%	28%
Austria 53 million pounds	Belgium 46	France 41	Poland 42	Central Asia 52	Siberia 38	British India 30	All others 120

Data from Year Book of Agriculture, 1920

FIG. 272. *The world's flax fiber crop. Total, five-year averages, 422 million pounds.*

60%	14%	14%	12%
Russia 707 million pounds	Austria 171	Italy 166	All others 144

Data from Census Bulletin, No. 100

FIG. 273. *The world's hemp fiber crop. Total, pre-war basis, 1,188 million pounds.*

in Europe. (Fig. 276.) Grapes and tobacco occupied patches scattered from Kishinev to Saratov. The northern limit of grape growing is here fixed by the cold of winter, while in western Europe it is determined by the lack of heat in summer.

In the southeast of Europe, beyond the line of the Don-Volga rivers and in the adjacent parts of central Asia, are steppes or poor grasslands occupied by wandering shepherd tribes of Mongolian race and Mohammedan religion. These steppes support chiefly sheep and goats, besides horses and camels for transportation purposes. Russia was richer in horses than any other country in Europe.

482. Subtropical Russia. Finally, in the southern Crimea, in Transcaucasia, and Turkestan are sheltered valleys, shaded

and musical with the sound of running water, forming an Eastern Italy. Here were grown in profusion subtropical products such as the vine, olive, mulberry (for silkworms), and cotton. The principal cereals grown in this zone were maize and rice. Tea gardens had also been established in Transcaucasia. This region is said to be the original home of the vine; and central Asia furnished a large part of the raw cotton used in Russian mills. (Fig. 84.)

483. Other Resources of Russia. The Caspian and Volga abound in sturgeon, yielding caviare (fish eggs) and isinglass (fish sounds or swim bladders) for export.

Russia is rich in minerals, especially mineral fuels. The petroleum output around Baku exceeded in some years that of any other single district in the world, and other oil pools are known in Siberia. (Fig. 138.) The coal fields of European Russia exceeded in area those of the rest of the continent. The four principal fields are the Ural, Tula, Warsaw in Poland, and the Donets, the latter containing anthracite. There is also an important field at Kutais in Transcaucasia, and others of immense though unknown extent in Siberia.

Iron ore is abundant near all the principal coal fields and also in Finland. Zinc is mined near the German frontier; gold in the Ural district and eastern Siberia; copper and platinum chiefly in the Urals; manganese and rock salt in Transcaucasia. Russia has had the largest output of gold in Europe, and the largest output of platinum and manganese in the world. (Fig. 223.) Platinum is indispensable in chemical operations, owing to its resistance to heat and acids. It is therefore worth more than its weight in gold. In addition, eastern Siberia is said to contain large deposits, practically untouched, of all the industrial metals, besides graphite and asbestos.

484. The Manufactures of Russia. Russia, producing abundant raw materials, naturally had considerable manufactures of lumber, flour, sugar, tobacco, and leather, besides domestic industries such as Bukhara rugs. Russian leather

owes its peculiar odor to the birch used in tanning. Kazañ, on the border of forest and prairie, where hides and bark for tanning are available, is prominent in leather working.

Under the stimulus of a high protective tariff, and aided by vast investments of French capital, Russia had also developed (since 1890) important textile and mineral industries.

The textile industry was largely localized in four districts. Petrograd and the factory town of Narva, possessing water power, were noted for linen and hempen goods. Moscow, near the Tula coal field, manufactured silks, cottons, and woolens. Warsaw and the adjacent factory town of Lodz in Poland made cotton goods. Tiflis in Georgia, Transcaucasia, produced carpets. The consumption of raw cotton increased more rapidly in Russia than it did in the United States,[1] and Russian cotton goods competed with the products of South Carolina and Georgia mills in the Orient. Russian rubber wares were likewise articles of export.

The output of pig iron more than tripled during the ten years ending 1900. (Fig. 282.) The principal iron-smelting center was Krivoi Rog, over rich iron ores and near the Donets coal field. Arms and cutlery were manufactured at Tula. Glass and pottery were likewise chiefly made on the coal fields, though the Imperial porcelain factory was at Petrograd.

485. Water Ways. Like Canada, Russia is a country of magnificent water ways.

The great rivers of European Russia, navigable almost to their sources, flow from a common center in the Valdai Plateau (1,150 feet). These rivers, moreover, being connected by canals, carry light-draft vessels from the Baltic and Arctic to the Black and Caspian seas.[2] The Volga—"Mother Volga," the Russians call it—carried by far the largest tonnage notwithstanding its waters are lost in a landlocked sea. Next

[1] From 1891 to 1900 the increase in consumption of raw cotton was: in Russia, from 300 to 587 million pounds; in the United States, from 1,408 to 1,656 million pounds.

[2] By way of the Vistula, Memel, and Düna to the Dnieper; the Neva to the Volga; the Dvina to the Neva and Volga.

come the Neva and "Father Dnieper." All Russian waterways are icebound for several months each year.

In Siberia (once Asiatic Russia) there is continuous water transportation by means of the east and west tributaries, and an Ob-Yenisei Canal, almost from the Urals to Lake Baikal. Heavy freight also sometimes reaches the Ob and Yenisei by sea. In the main, however, the Arctic drainage of the Siberian rivers is a fatal defect. The Amur, on the other hand, by its eastward course opened a route for Russian expansion, and now serves as a highway of commerce to the Pacific.

486. Land Transportation in Russia. Wagon roads hardly exist in Russia, outside of the Baltic provinces, where they are due to German settlers. Goods are therefore moved chiefly in winter on sledges, but in central Asia by camel caravans. It was frost, indeed, which originally unified the Russian Empire by favoring rapid transportation.

The level surface has favored the construction of railways. They are mainly government property and for military reasons differ in gauge from those of Germany and Austria. Both passengers and merchandise must, therefore, change cars at the frontiers. The railway centers are Moscow and Warsaw in Poland, centrally situated in the Russian and Polish plains. Samara, located on the great eastern bend of the Volga, is the junction point for the Siberian and central Asia railways, though a line leaving the Siberian Railway farther north now runs direct to Petrograd.

In Transcaucasia, Batum and Poti (the Phasis of the Greeks where the Argonauts sought the Golden Fleece) are linked by rail[1] with Baku on the Caspian, and Baku with Moscow along the Caspian.[2] These roads have handled most of the commerce of Persia as well as the vast traffic in oil from the Baku district. A pipe line has, however, been constructed to carry petroleum from Baku to the Black Sea. The railway has also been extended through Erivañ on to the Armenian

[1]Through the Suram Tunnel.

[2]Through Derbent Pass, between the mountains and the Caspian. A shorter line is projected through Dariel Pass behind Tiflis.

plateau, whence Russia, confident in her "manifest destiny," looked forward to the conquest of all western Asia.

Two Russian railways penetrate central Asia to Tashkent, one line branching from the Siberian Railway at Orenburg, the other starting from the Caspian Sea and skirting the mountains which wall in Turkestan on the south and east. In this region are Merv, Samarkand, Khiva, and Bukhara, once rich and famous as centers of civilization and learning when they received more moisture, and a vast overland trade from

FIG. 274. *Vladivostok, the terminus of the great Trans-Siberian Railway.*

China and India took this route toward Europe. (Fig. 3.) These railways carried much raw cotton and wool to Russian mills, and diverted most of the transit trade of central Asia from Afghanistan[1] and India to Russia.

487. The Siberian Railway. The great Siberian Railway is well named "The Path of Empire." It is now completed around Lake Baikal—a sheet of water nearly the size of Lake Michigan, where trains were formerly ferried across—and finds its outlets on the Pacific at Vladivostok (Fig. 274.) and Dairen[2]

[1] Leaving the historic Bamian (Hajikhak) Pass almost untrodden.

[2] Crossing the Yablonovoi Mountains by a low pass (3,400 feet) and going through the Great Khingan mountains by a tunnel. Another railway line extends to Vladivostok along the Amur River, on soil peopled by Russians.

(Dalny). Through trains from Paris to Peking reduced to about one-fourth (from sixty to fourteen days) the time between London and north China. This railway restored the overland trade of Asia to importance for the first time since Vasco da Gama found the sea road to India. It has carried into Europe much of the tea, raw silk, and other commodities which formerly went by sea, and almost monopolized the passenger traffic as far south as Shanghai. The Siberian Railway also competed with the Pacific railways in America, and with the Panama Canal, for trade between the Orient and western Europe.

488. The Seaports of Russia. Russia is essentially an inland state. For centuries its history has been dominated by the struggle to reach the ocean. Peter the Great carried the frontier to the Baltic; his successors won their way, sword in hand, to the Black Sea, the Caspian, and the Pacific.

The Baltic, corresponding in position to the Great Lakes in America, has been commercially the most important sea to Russia because it offered the shortest routes to Germany and Great Britain, which were the best markets for Russian products. The principal Baltic ports are Petrograd, accessible by a channel or "canal" dredged in the shallow gulf; Riga, an old Hanse town at the mouth of the Düna, the capital and outlet of Latvia; Revel, the capital of Esthonia, and Helsingfors, the seat of government in Finland.

In summer Archangel on the Arctic is also an important seaport, rivaling Riga and Revel as an outlet for Siberian products.[1]

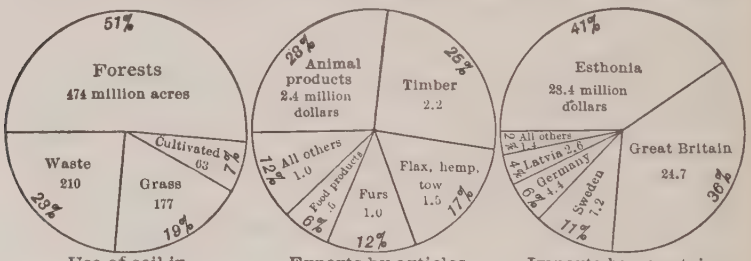
On the Black Sea, Odessa (Greek Tyras), with a fine artificial harbor, between the mouths of the three main western rivers, is the leading seaport, though exceeded in tonnage by Astrakhan on the Volga. Odessa ships chiefly grain. Nikolaiev at the mouth of the Southern Bug has now secured deep water, and is a close rival of Odessa. Rostov at the mouth of the

[1] Which go by rail to Kotlas, the head of navigation on the Dvina, and thence by boat.

Don is also an important port, though not accessible to the largest vessels.

Russian merchant vessels have had a free and a safe passage at the Bosporus in time of peace. The only thing Russia lacked on the Black Sea, which possession of Constantinople would give, was free passage in war and the power to exclude from it all but Russian vessels, as she did on the Caspian.

On the Pacific the commercial and naval seaport is Vladivostok (Rule-the-East) on a fine land-locked harbor now available at all seasons, as ice breakers keep it open in winter.



Report of Com. of Foreign Trade, Soviet Russia

FIG. 275. *Use of soil and commerce of Russia. Area of Russia in Europe, 924 million acres. Commerce in 1921 (millions of dollars): exports, 8.6, chiefly to Great Britain and Germany; imports 86.7, largest items, foodstuffs, seeds, and agricultural implements. All other countries does not include the United States whose exports to Russia for the first six months of 1921 amounted to 12.6 million dollars.*

489. Fairs in Russia. Owing to insufficient facilities for transportation, the ancient fair at Nijni Novgorod on the Volga still retains its importance. It brings together every August several hundred thousand traders representing every tongue of Europe and Asia. At Irbit, east of the Urals, is held in February a great fair for the sale of Siberian furs.

490. The Commerce of Russia. Russia exported mainly foodstuffs and raw materials, except to Asia, where she acted as an exporter of manufactures. Russian imports, on the other hand, aside from cotton, tea, and fish, were largely manufactured goods such as the Russian factories, owing to

lack of experience and of technical skill, cannot yet produce.

By her exports of grain, eggs, dairy, and other farm products Russia was the chief competitor of American farm products in Europe. (Fig. 275.) Manchurian flour from the Harbin mills also disputed the oriental market with American flour. Baku oil is the leading rival of American oil for the world markets. Asia favored Russian manufactures, especially cotton goods, by discriminating port dues, unequal railway rates, and the refusal of the Russo-Chinese Bank to finance only merchants handling Russian goods. As exporting nations, therefore, Russia and the United States were not less opposed in interests than they are in ideals, social conditions, and political principles.

491. Possessions of Russia. The expansion of Russia across Asia began (1581) before the first English colony had been planted in America. Russian Asia was an integral part of the empire, except northern Manchuria, nominally Chinese, also Khiva and Bukhara, which were Russian protectorates.

In like manner the Baltic provinces and Poland lost every vestige of independence; the same process of destroying political rights had begun in Finland, which had retained, since its cession by Sweden (1809), a separate constitution and parliament.

The Russian Empire embraced more than half of Europe and a third of Asia, altogether nearly a sixth of the world, with almost double the population of the United States; and Siberia was the only large area in the Temperate zone, except Canada, still almost unpeopled. Russia alone of the Old World nations thus had room to grow.

Since the revolution of 1917 Russia has broken up into many parts and civil war has been constant, so that her industries and trade have greatly declined or ceased. Of the republics that sprang up with the overthrow of the Czar undoubtedly only the strongest can maintain their complete independence.

492. World Industries. In order to enjoy the highest prosperity, each community is forced to follow the industries for which it has the greatest advantages. Different communities and countries thus come to differ as to their leading industries (Fig. 231). Such difference constitutes geographic division of labor, which forms the basis of commerce between countries. It is only as people differ in their industries that they have occasion to exchange their products (§56 and §70).

Industries carried on largely with a view to supplying the needs of other countries are world-industries, and the commerce in their products is world-commerce. Of these, a few stand out as of conspicuous commercial importance.

493. Wheat. The most imperative need of man is food; the principal foodstuffs are the cereals; and by far the most important commercially of the cereals is wheat (§111).

In old and densely-peopled countries, like France, and England, wheat is rotated with other crops on the same soil. With this system of farming, the yield per acre is large.

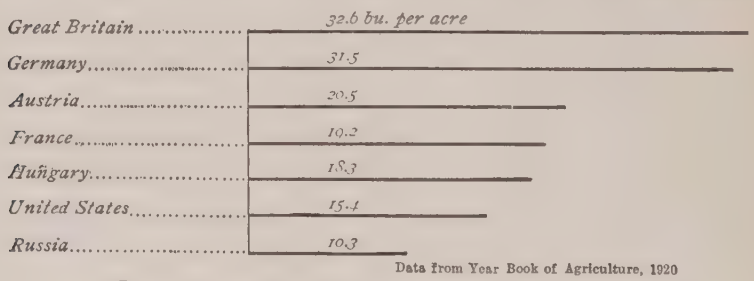
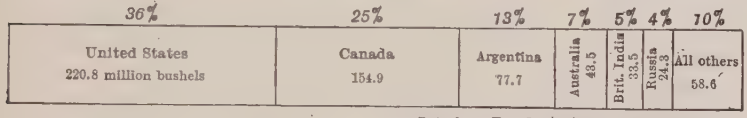


FIG. 276. *Average yield of wheat per acre, 1911–15.*

(Fig. 276) and the total crops are likewise large. For this reason, Europe produces more than half the wheat crop of the world. (Fig. 43.) Nevertheless, owing to the dense population of Europe, little of this wheat enters international commerce.

On the other hand, in new and thinly-peopled countries, like the United States and Argentina, the yield per acre is low,



Data from Year Books, Dept. of Agriculture

FIG. 277. *Exports of wheat and flour. Total, five-year averages, 613.3 million bushels.*

but modern farm machinery enables one man to farm many acres. The aggregate crop is thus far in excess of the local demand. Such countries are consequently the principal sources of the wheat that enters international commerce. Thus, although Europe is the largest producer (Fig. 43) of wheat, the United States, Canada, and Argentina, are the principal exporters (Fig. 277), while the densely-peopled countries of Europe, especially Great Britain, are the largest importers. Russia (one of the least densely peopled countries in Europe) is the greatest exporter of that continent.

Since the invention of plowing and harvesting machinery, wheat growing has more than ever tended to concentrate in the plains, where the level surface favors machinery. (§73).

494. Sugar. Sugar is not only a condiment, but also a concentrated food, enabling men to undergo heavy and prolonged labor without exhaustion. In fact, it is so concentrated a food that it has something of the same effect as a stimulant, which accounts in part for its popularity.

Cane sugar was originally the product of exuberant tropical nature plus cheap—that is, slave—labor. To a great extent it is still a poverty industry, based on a rate of wages, and therefore a standard of living on the part of the laborer, far below what is necessary to a decent civilized existence. In recent years, however, the competition of beet sugar has compelled the investment of large capital in machinery, and the use of scientific methods for the extraction of cane sugar.

Sugar beets also require considerable hand labor in the fields, because they must be thinned by hand. For this work

imported laborers are commonly employed at a low wage—in Germany, for example, largely Poles. But all the other operations have from the start been based on science and high technical skill. Beets are moreover a temperate crop, yielding a large return per acre; and the advantages of beet culture are at the maximum where beets do not have to compete for the soil against corn, either because the climate is too cool, as in Germany, or too dry, as in Colorado and California. Further, beet culture is more profitable where the soil is cultivated intensively for other crops, since the fertilization and cultivation necessary for beets increase the yield of other crops; also where the beet pulp, after the juice has been extracted, can be fed to stock; and finally, where high technical skill can be depended on for the manufacturing processes.

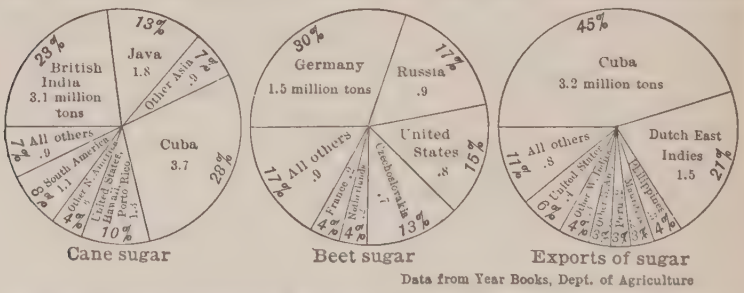


FIG. 278. *Sugar industry of the world. Totals, five-year averages (millions of tons): cane, 13.4; beet, 5.2; total production, 18.6; exports, 7.1. Export statistics of Germany, Belgium, and Russia, not available.*

For all these reasons, sugar beets are perhaps the most characteristic and important product of scientific agriculture on rich land, in densely-peopled districts of the Temperate Zone.

As a result, the production of cane sugar is localized in countries like India, Cuba, and Java, while Europe is the chief source of beet sugar. (Fig. 278.)

495. **Coffee, Tea, and Cocoa.** Coffee, tea, and cocoa belonging to the group of stimulants (§113) are highly commercial crops; that is, they are grown on limited areas, and in the main for the market.

Cocoa is native to the damp, hot tropical lowlands, and it requires much hand labor. For both reasons, it is distinctly a poverty industry carried on almost exclusively by colored laborers (§74). In fact, slavery (in all but name) still persists on cocoa plantations, especially in the west African islands. The larger part of the cocoa supply, however, comes from tropical America, chiefly Brazil, Ecuador, and Venezuela. (Fig. 185.)

Coffee is also a tropical plant, but the best grades can be grown only on the highlands which have a moderate climate. Moreover coffee, having considerable value in proportion to its bulk, is a favorite crop in districts remote from wagon roads, not to say railroads. For all these reasons, coffee has been the mainstay of the small white farmers, not alone in Porto Rico, but throughout Central America and the northern part of South America. The success of Brazil in coffee culture seems, however, to indicate that coffee can be grown more cheaply on immense plantations equipped with light railways and other labor-saving machinery. As in the case of cocoa, the bulk of the world's coffee supply comes from America, the largest producer being Brazil. (Fig. 185.) The largest consumer, both of cocoa and coffee, is the United States.

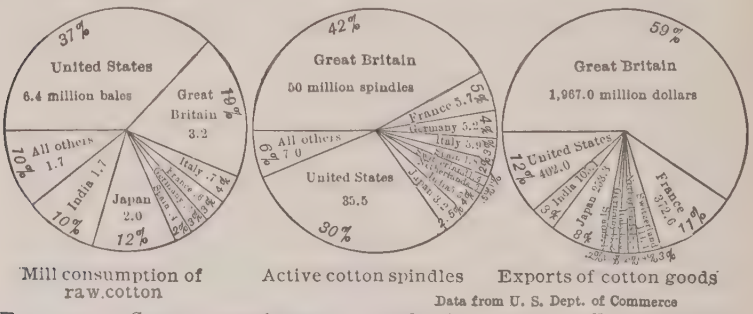
Tea is native to a region having warm, rainy summers, but a fairly cold winter. Like cocoa it requires much hand labor in picking, and is therefore another poverty industry, which cannot be carried on where laborers receive more than a few cents a day. For this reason China and Japan long had a practical monopoly of tea growing. In India, Ceylon, and Dutch East Indies, however, the labor is equally cheap; tea planted on the highlands in a tropical country bears leaves the year around in place of only a few months; and labor-saving machinery has been devised for curing the tea. These advantages explain the present predominance of India, Ceylon, and Dutch East Indies in tea growing. (Fig. 222.) The principal consumers of tea are Great Britain and Russia.

496. Raw Cotton. Cotton is also a tropical plant, but it is now acclimated as far north as 37° in America and 40° in the

monsoon region of Asia (§51), where it is grown as an annual. Indeed, the chief producing areas are outside the Tropics, perhaps in part because a sharp winter helps to keep in check the insect pests which assail the crop. (Fig. 84.)

Cotton growing also requires much hand labor, especially during the picking season. Cotton is therefore limited as a commercial product. not only by conditions of soil and climate, but also by the supply of cheap labor.

497. Cotton Manufactures. On the other hand, low-grade labor, which suffices for picking cotton, cannot well be used in cotton manufactures. Spinning and weaving require not so much cheap labor as efficient labor, in order to earn the best returns on the capital invested in machinery Even in the south, negroes are seldom employed in the cotton mills. For this reason, among others, the chief cotton growing sections are not the chief centers of cotton manufactures of the finer kinds. (Figs. 84 and 279.) Cotton spinning, however, especially of the lower counts (coarser thread) has made some progress in countries such as India, Japan, and China, notably since the invention of the ring-spinning machine, which is largely automatic and therefore requires less skill on the part of the operator.



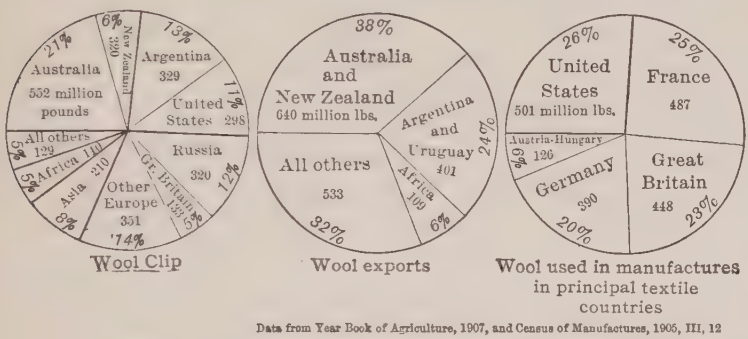
Mill consumption of raw cotton — Active cotton spindles — Exports of cotton goods

Data from U. S. Dept. of Commerce

FIG. 279. *Cotton manufactures. Totals in 1920: mill consumption (millions of bales), 17.2; cotton spindles (millions), 119.6; exports (millions of dollars), 3,356.8. Price of cotton goods abnormally high.*

The amount of raw cotton used in the mills of the United States is greater than in any other country, but the British

mills, which spin the finer counts, have by far the largest number of spindles. Great Britain, where the cotton industry



Data from Year Book of Agriculture, 1907, and Census of Manufactures, 1905, III, 12

FIG. 280. *The wool industry of the world. Totals, pre-war basis (millions of pounds): wool clip, 2,605; exports, 1,683; wool consumption, 1,952.*

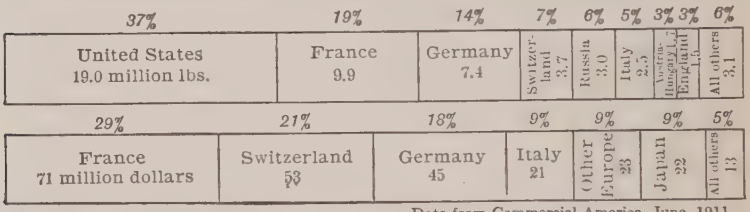
employs a large part of the population, also supplies most of the cotton manufactures entering international commerce, though Germany had become a serious rival before the war.

498. Wool and Silk. Wool is in part a by-product of flocks kept primarily for mutton, as in Europe. In such countries, however, the population is usually dense and the demand for wool exceeds the supply. The wool entering international commerce therefore comes in the main from sparsely-peopled countries, especially those which have wide semi-arid regions devoted to stock raising, like Australia and Argentina. (Fig. 280.)

The silkworm is limited by climate to districts where the trees will grow on which it feeds (§105). The production of raw silk on a commercial basis is further restricted by the price of labor. A large amount of handwork is involved in caring for the worms, hence cheap labor is indispensable. The industry is consequently limited to countries having a dense population and a low standard of living, like China, Japan, and Italy. (Fig. 281.) This is the reason why all efforts at sericulture in this country have failed. The silkworm

will thrive here, but the raw silk industry will not, because the people are making better wages at something else.

499. Woolen and Silk Manufacture. On the other hand, the manufacture either of woolen or silk goods calls for skilled



Data from Commercial America, June, 1911

FIG. 281. *Raw silk used in manufactures and export of silk manufactures. Totals, pre-war basis: mill consumption, 51.8 million pounds; exports, 248 million dollars, "Others" under exports means chiefly China (11 millions.)*

and intelligent labor. This is no doubt one reason why, as in the case of cotton, the same countries are not the most prominent both in the production of the raw materials and in the textile industries using these materials. (Figs. 280 and 281.)

The silk and woolen mills of the United States use the largest amount of raw silk and wool. The finer grades of silks and woolens are, however, more extensively manufactured in Europe, especially in France, Great Britain, and Germany. These three countries, where a much larger part of the population is employed in silk and woolen manufactures than in the United States, controlled in 1911 the bulk of the export trade in silk and woolen goods.

500. Rubber. Like other plant products, rubber can be produced only where soil and climate are suitable; and most of the rubber plants are tropical. Here again, however, the commercial rubber industry is confined to smaller areas than the rubber plant. The collection of wild rubber is difficult and dangerous to health, yet commands relatively small wages. The rubber gatherers in many districts are consequently kept in perpetual debt to their employers, which practically amounts to slavery. The cultivation of rubber plants, which has now assumed great importance, also involves much hand

labor. For this reason it is practically confined to countries of dense population and low wage standards, like parts of Malaysia and Ceylon.

The manufacture of rubber goods, on the contrary, calls for scientific training and skill. This fact, as in the previous cases, tends to separate the countries of manufacture from the countries of origin. Rubber is largely produced in Brazil, the Dutch East Indies, Malay Peninsula, and Ceylon, but undergoes the various processes of manufacture in Europe and the United States. (Fig. 185.)

501. Minerals. The location of useful minerals depends absolutely on nature; and so in part do transportation facilities, indispensable to any sort of mining. Thus coal is more valuable if located near iron and limestone, especially if it be also near navigable water. On the other hand, many rich mineral deposits cannot be worked because inaccessible, or accessible only at too great cost. This is true in some parts of Alaska.

In the last analysis, however, while the location of minerals depends on nature, their utilization depends on man. Nature endowed China with rich mineral resources, but man has made little use of them (§331). Nature endowed England with rich coal fields, but in 1750 many mines had been abandoned

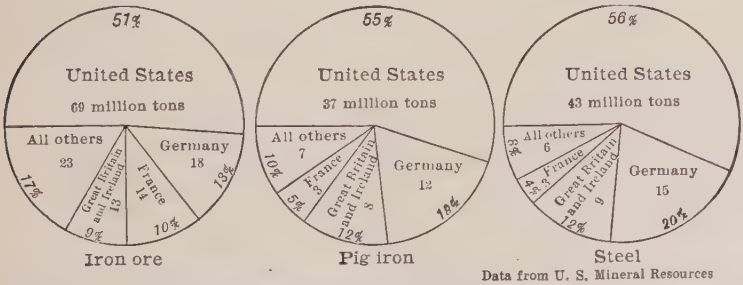


FIG. 282. *The iron industry of the world. Totals in 1920 (millions of tons): ore, 137; pig iron, 67; steel, 76.*

because, until the invention of the steam pump, they could not be kept free from water. Finally, the utilization of mineral

resources depends not only on the efficiency of tools and machinery, but perhaps even more on the relative cost and efficiency of labor. It was for this reason that the mine owners in South Africa imported Chinese coolies.

Minerals having a large value in small bulk can be mined (if only the deposits be rich enough) wherever a man and a donkey can climb. Gold mining is thus, in the main, a frontier industry.

On the other hand, the lower the value of any mineral in proportion to its bulk, the more completely does its utilization depend on cheap transportation, efficient (which means expensive) machinery, and either cheap or highly-skilled labor. These conditions are only realized where there is a numerous population and a considerable accumulation of capital. In turn, the utilization of mineral resources builds up industries which still further increase the population and wealth of a country. Moreover, those minerals such as coal and iron, which have a relatively small value per ton, have frequently the largest value in the aggregate, because of the extended use made of them. For all of these reasons, the greatest mining countries are the United States, France, Germany, and England. (Figs. 138 and 282.)

The minerals entering most largely into international commerce are still the metals, as they have always been (§7), especially gold, iron, and copper; and, in addition to these, mineral fuels.

502. Rank of Nations in Manufactures. The United States clearly ranks first in the production of iron and its derivative products. This appears from the diagram showing the world's production of iron ore, pig iron, and steel (Fig. 282): and from the diagrams showing the consumption of coal and the production of pig iron, per capita.[1] (Figs. 283 and 284.) The United States even takes a relatively high rank in the export of machinery. (Fig. 285.)

[1] It must be conceded, however, that part of the large consumption of coal and iron in the United States represents waste of natural resources, which could be in part avoided by the use of water in place of rail transportation for heavy and bulky commodities.

Great Britain is the greatest textile manufacturing country in the world and has the largest export trade in textiles, especially in cottons. (Figs. 279 and 280). It likewise ranks next to

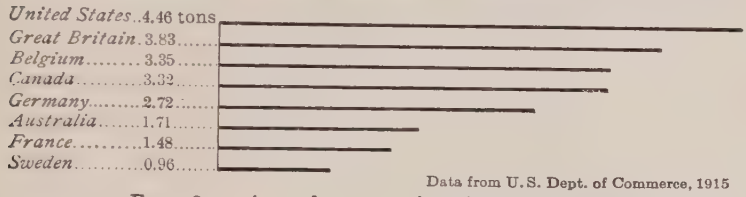


FIG. 283. *Annual consumption of coal per capita.*

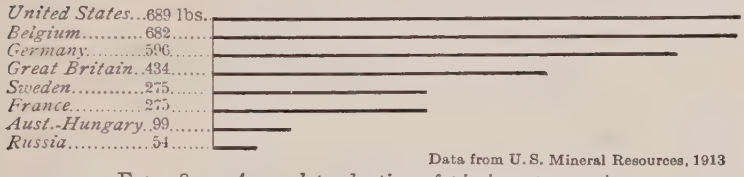
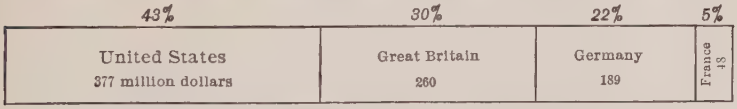


FIG. 284. *Annual production of pig iron per capita.*

the United States in the per capita use of coal, and is second in exports of machinery, Germany passed Great Britain and in 1913 was second in iron and steel. (Figs. 282, 283, 284, 285.)



Data from Machinery Div., U. S. Bur. For. and Domestic Commerce

FIG 285. *Relative exports of machinery. Total, two-year averages, 874 million dollars.*[1]

Germany held second place (by a wide margin) in steel and textiles before the World War and was first in chemicals, especially aniline dyes and other coal-tar products.

In exports of manufactures, Great Britain led in 1907, with Germany, the United States, and France following in order. (Fig. 286.) It must be confessed, however, that most of the American manufactures in question were foodstuffs or raw materials but little elaborated (§213). Though supplying the

[1]Average rates of exchange for Great Britain, Germany and France are from Federal Reserve Board: pound sterling, 1920, $3.664; 1921, $3.6490; franc, 1920, 7.04¢; 1921, 7.4554¢; mark, 1920, 1.751¢; 1921, 1.2045¢.

bulk of the world's raw cotton, the United States imports more cotton goods, especially of the finer grades, than it exports.

The relative rank of these countries in manufactures is partly a matter of natural resources, especially fuel, water

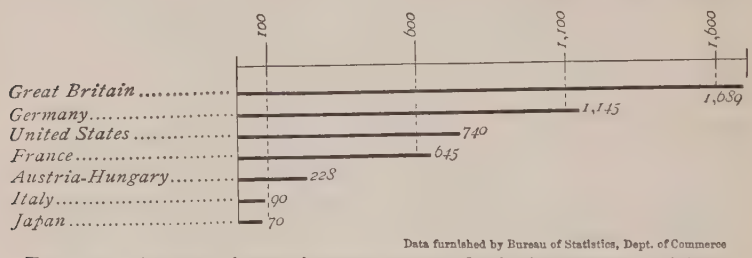


FIG. 286. *Exports of manufactures, pre-war basis, in millions of dollars.*

power, and raw materials. Lacking such resources, no country can compete successfully in the manufacture of machine-made goods. But these localizations of industries also result in part from the human factor in production. Thus Great Britain got a tremendous start of other countries not solely because of richer coal fields, but also because power

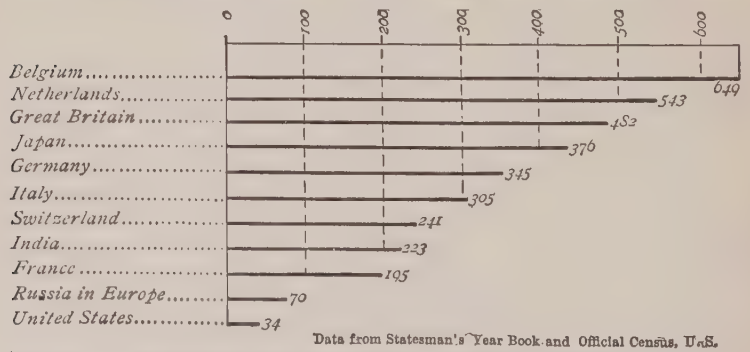


FIG. 287. *Population per square mile of principal commercial countries.*

machinery was first perfected in England, and because successful wars assured a large colonial market for British goods. Later the adoption of free trade gave cheap foodstuffs and also cheap raw materials for British

industries. At present Great Britain still has the immense advantage of accumulated capital, business experience, and business prestige. The rise of American manufactures was due primarily to abundant water power, coal, and raw materials, together with the inventive talent and the mechanical bent of the people. The industrial development in the country was greatly hastened by the protective tariff; although protection necessarily tended, by increasing the cost of production, to check the development of export trade in manufactures. Finally, in the case of Germany, it was chiefly by reason of the human factor in production, and especially through scientific

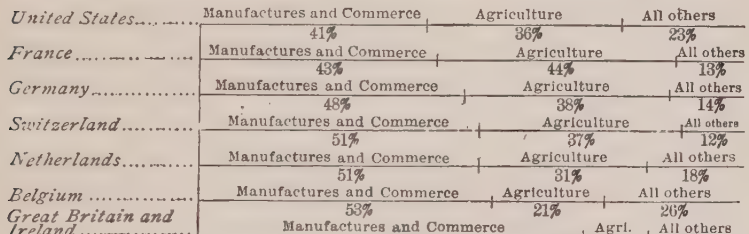


FIG. 288. *Occupations of people. Note the relative proportions in manufactures and agriculture.*

training for industry and commerce, that this country became within the space of a single generation, one of the great manufacturing and commercial nations of the world.

The extent of industrial and commercial development in the several countries will appear from a comparison of the density of population with the proportion of people following different occupations. (Figs. 287 and 288.) Belgium and the Netherlands, it will be noted, have an even greater population in proportion to size, than any of the larger countries. Such a population can be supported because Belgium combines manufactures, and the Netherlands combines a vast transit trade, with intensive agriculture.

503. **The Organization of Commerce.** The development of an export trade in manufactures depends, not alone on the

quality of the goods and their price, but also on the methods of sale. It is, moreover, in the sales department that European firms doing an export trade are especially strong (§300).

On the other hand, American manufactures are, as a rule, of acknowledged excellence, but most firms have regarded foreign trade merely as a stop-gap for dull times. The ruling idea has consequently been to make large profits on few sales, rather than small profits on many sales. Foreign commerce until recently, had not commanded the undivided attention of the American nation, as it did in England and Germany. These facts explain why it is that, judging from the United States Consular Reports, Americans have not shown conspicuous capacity abroad as merchants; yet their conquest of foreign markets for manufactures will depend upon their ability to organize and go forward as merchants with the same energy and efficiency that they have shown as producers.

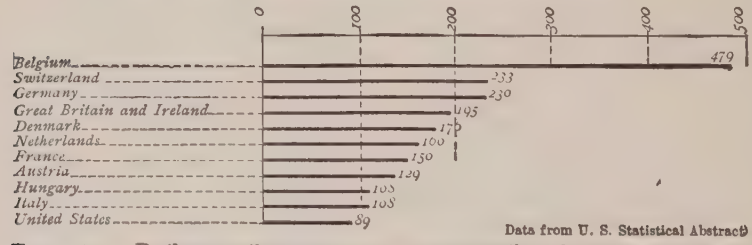
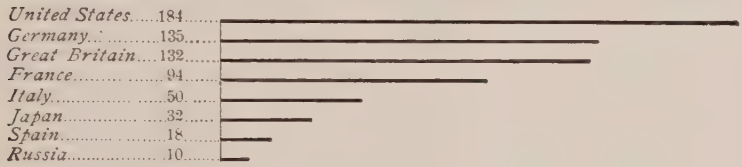


FIG. 289. *Railway mileage per 1,000 square miles of territory, showing relative density of railways.*

504. Transportation as a Factor in International Commerce. Transportation in relation to foreign commerce usually involves three things: transportation by land, ports where the commerce of the land may connect with the commerce of the sea, and, finally, transportation by sea.

In respect to transportation by land, the condition of the United States is not all that could be desired. The inland water ways are little used and the density of railways is much less than in Europe. (Fig. 289.) Nevertheless, nearly half the railway mileage in the world is in the United States, while

railway rates are lower here, and railway service more efficient, than in any other country. (Tables 4 and 5.) The post is also

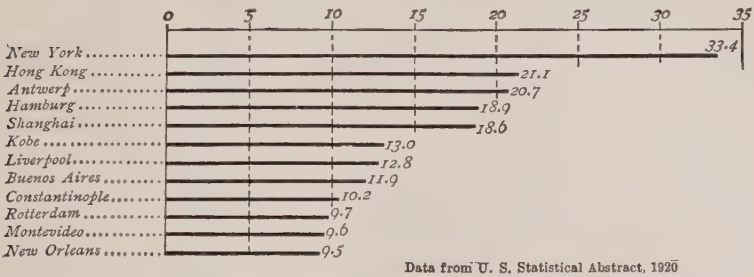


Data from Gov. Ownership of Electrical Means of Communication, Sen. Doc. No. 399

FIG. 290. *Pieces of mail handled yearly per capita.*

more largely used in the United States than anywhere else—an evidence at once of active intelligence and of greater business activity. (Fig. 290.)

In facilities for the commerce of the land and sea to meet and connect, the United States is not, on the whole, in the same class as the great nations of Europe. (Fig. 292.) This is moreover the fault, not of nature, but of man. American seaports are largely monopolized by private wharves and docks. To compete with Liverpool, Hamburg, and Rotterdam, in export trade to neutral markets, it is necessary to create, as they have done, commodious free harbors where any vessel may load or discharge cargo promptly and cheaply without



Data from U. S. Statistical Abstract, 1920

FIG. 291. *Rank of world's greatest seaports, measured by millions of net registered tonnage in foreign trade, latest available year. Figures for Constantinople and Hamburg are for 1921; Rotterdam for 1920.*

being dependent on costly private terminals. In New York some steps have already been taken to provide such facilities.

In the matter of transportation by sea, the United States was still more poorly equipped. The other nations taking an active part in world commerce all had large fleets of merchant vessels. (Fig. 292.) The United States, on the other hand, had few sea-going merchant vessels aside from those engaged in the coasting trade, which is reserved by law to American vessels. It costs more to build ships here than in Europe; and it costs more to operate them, because the standard of living and the scale of wages are both higher in this country. As a result, in many parts of the world the American flag had become a strange and unaccustomed sight. The annual payment to for-

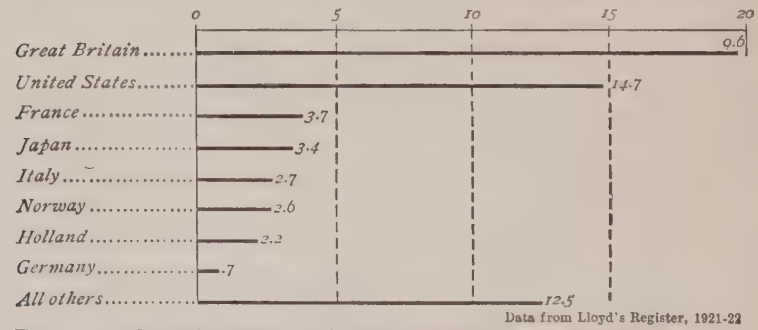


FIG. 292. *Sea-going tonnage of chief commercial nations. Total in 1920, 62.1 million tons. Nearly all the American tonnage is in coastwise service, where American vessels have a monopoly by law.*

eign ship owners for carrying American goods was estimated to be 150 million dollars[1]: and the losses to American industry from the lack of adequate shipping facilities, and from the discriminating rates often charged by foreign vessels, must have largely exceeded that amount.[1]

505. The Two Currents of World Commerce. Commerce is based on unlikeness of products; and unlikeness of products has two principal causes (§56).

[1] By W. W. Bates, U. S. Commissioner of Navigation. In thirty years this expenditure has amounted to 4,500 millions, according to the estimate. Fisk, *Commercial Policies*, estimates the annual payment at 200 million dollars. It must be said, however, that all such estimates are little better than guesswork.

Some countries differ in products because they have reached different stages of industrial development. Thus western Europe, where modern methods of manufacture were first applied, is still the greatest manufacturing district in the world, selling manufactured goods to the less developed countries to the eastward, and also to the westward in America and Australia, and buying in return foodstuffs, cotton, and other raw materials. The current of commerce created by such difference in economic development flows for the most part in an east and west direction and is at present the more important.

A second reason why countries differ in products, and consequently engage in commerce with one another, is climate and natural resources. For example, difference in climate is the basis of the trade between the West Indies and the United States, and also of the oriental trade which connects tropical Asia with temperate Europe. Unless diverted in some manner, the current of commerce based on climate naturally flows in a north and south direction.

This current of commerce based on climate is at present less important than one would expect from the rich natural resources of tropical countries, by reason of the human factor—the character of the inhabitants in the Torrid zone, barbarous if not savage, having few wants, and therefore indisposed to labor. Nevertheless commerce based on climate promises in the not distant future to become the more important: for Europe is slowly losing its preëminence in manufacturing, but difference in climate is permanent, and its influence on commerce is not to be avoided by any wit of man.

XXXVI—THE WORLD WAR

"War's a game which were their subjects wise, kings would not play at."
—Cowper.

506. Effects of War. War is the enemy of trade and commerce. It blocks harbors and curtails the freedom of the seas. It alters the purchasing power of money and causes great disparity of prices in the markets of the world. It strikes at the heart of industry and discourages the production of all things not essential to carrying on the conflict. In its destructive course it draws out of the world's storehouse much of the wealth accumulated by the efforts of mankind through successive ages.

Out of every great conflict in the past there developed a situation paralleling in a greater or less degree that which has followed the World War. But because of the number and importance of the nations involved in this war, the stupendous sums of money spent, and the appalling destruction of life and property, the effect on commercial conditions has been greater and more far-reaching than ever before.

The world—an orderly and on the whole a smooth-running piece of machinery—was suddenly smashed to atoms. The pieces can never again be fitted together as they were before. Whether or not there can be built out of these pieces a new machine which will operate as smoothly as the old, and produce as good or better results, remains to be seen.

The present-day map of Europe (Fig. 295) bears little resemblance to the map with which we have long been familiar. As a result of the war old nations have been dismembered and new nations have sprung into existence; many international boundaries have been wiped out and many new ones established—approximately one-third of the present 10,000 miles of international boundaries in Central Europe dates from the World War.

of the empire arose three separate republics — Austria, Hungary, and Czechoslovakia. (Fig. 296.) These three states, however, formed only a part of the former Hapsburg territory. Large areas were annexed to neighboring states which claimed that the predominant people in these regions were allied to them through racial and linguistic characteristics. (Fig. 299.) Thus Croatia, Slavonia, Bosnia, and Dalmatia united with Serbia to form the kingdom of the Serbs, Croats, and Slovenes (Fig. 296), or Yugoslavia, the name by which the country is commonly known; Poland acquired Galicia; Transylvania passed to Rumania; while in addition to the southern part of Austrian Tyrol, Italy gained the Istrian Peninsula, including the city and harbor of Trieste (Fig. 296), and the protection of an almost impregnable mountain frontier.

The Treaty of Sèvres practically excluded Turkey from the mainland of Europe and deprived her of large Asiatic provinces.

To Greece passed the city of Smyrna, with the adjacent territory, as well as the whole of Thrace, with the exception of the city of Constantinople and a small part of the peninsula on which it stands. Syria and Iraq, or Mesopotamia, became independent states under French and British guidance. Hejaz became an independent kingdom, and the administration of Palestine passed to the British Empire as a mandate. Although Turkish Armenia failed to gain independence, the Turks granted her, as well as Turkish Kurdistan, certain privileges of self-government. In Cyprus and Egypt the remnant of Turkish authority existing before the war was annulled. Egypt was created an independent kingdom with a guarantee of British protective rights, and Cyprus became British by annexation in the early days of the war.

The terms of the treaty were accepted by the Turkish authorities at Constantinople. But the Turkish Nationalists, with headquarters at Angora, refused to ratify the treaty or to recognize the claims of the Greeks. This impelled Greece to resort to arms to impose the provisions of the treaty. The struggle which followed was prolonged, fortunes of war

FIG. 299. *Austria-Hungary and its peoples.*

favoring first one side and then the other. Lack of efficient leadership finally resulted in defeat for the Greeks. Their army was driven from Smyrna, and Greece was forced to surrender eastern Thrace as far as the Maritsa River. The administration of Constantinople, which had been in the hands of the Allied forces, was yielded to the Turkish Nationalists, though military forces remained in the city ostensibly to protect the nationals of European nations.

The conference at Lausanne, called for the purpose of revising the Treaty of Sèvres, recognized the Turkish claim to eastern Thrace, Smyrna, and Constantinople. The Allies insisted, however, on the non-fortification of the straits and freedom of transit by vessels of all nations, under the supervision of an international commission. The question of sovereignty over the Mosul district, the northern portion of the British Iraq mandate, a region rich in oil, resulted in disagreement and a threat of renewed hostilities in the Near East.

Since the establishment of the Soviet government in 1917, the affairs of Russia have been reported as being in a woeful state of disorder. A number of states—Finland, Estonia, Latvia, and Lithuania—(Fig. 298), created out of former imperial territory, have set up independent republics. The greater portion of the Polish republic formerly belonged to Russia. Other racial divisions of old Russia form states or provinces of the so-called Union of Soviet and Socialist Republics, an organization said to be modeled after the plan of the original United States of America.

Although production and foreign trade remained abnormally low in 1922, conditions in the Soviet Union are slowly improving. Strong efforts are being made to reëstablish Russian industry, but the chief obstacle continues to be the lack of capital due to the unwillingness of foreign business to invest in Russian industries under the unfavorable conditions imposed by the government monopolies. While the production of oil has increased, the output is not enough to supply the demand. Agreements by English and American firms to work Russian

oil fields have been reported. More favorable weather conditions in 1922 promise improved conditions in the agricultural situation for 1923, although food supplies for the people will still be inadequate without further imports.

The Baltic republics, Finland, Estonia, Lithuania, and Latvia, all have strategic positions on the Baltic seaboard. (Fig. 298.) In time these states will doubtless form alliances, commercial or otherwise, with the Soviets, on whose commerce and resources they remain economically dependent.

Finland (Fig. 298) is farthest north of all the new states of Europe. It has an area of 125,000 square miles and a population of 3,500,000. While half of the inhabitants live by agriculture and cattle raising, less than 10 per cent of the land is devoted to these uses. Vast areas are occupied by peat marshes and bogs, and approximately one-half the country is forested. The prosperity of Finland is largely dependent on her forests and water power. Wood and wood products account for three-fourths of the country's exports.

508. Effects of the World War on Commerce. During the early part of the war the United States profited greatly from the sale of munitions and foodstuffs to the Allies. Although there was a sharp decrease in all trade at the outset of the war, the United States also benefited through shipments of products that formerly had been leading exports of Germany.

Other neutral countries, such as Argentina, gained much trade during the war because of increased demands for supplies, high prices, and lack of competition. But normal world trade practically ceased to exist. German submarines, until the closing months of the war, menaced all ships bound for Europe, and trade between neutral countries was carried on with increasing difficulty because of the strict and sometimes illegal search for contraband or war material, and the transfer of many vessels from commercial to war service.

Sixteen of the warring countries contracted new obligations to the extent of $212,000,000,000, or about $330 per capita. The share of the Allied countries in this vast sum is about

$150,000,000,000, or about $300 per capita, and that of the Central Powers about $428 per capita.

Germany's per capita debt is 33 times, Great Britain's 10 times, and that of the United States 21 times what they were before the war, but the debt of the United States includes more than $9,000,000,000 loaned to the Allied governments. Japan is the only important country that emerged from the great struggle with finances undisturbed as far as war debt is concerned.

The question of exchange rates is perhaps the most outstanding difficulty in the path of a return to normal trade conditions. During the war the United States and, in a lesser degree, Great Britain were in a position to produce enormous quantities of goods of various kinds which were sold to the countries where production was at a standstill. As a result these countries emerged from the conflict financially sound. It is not even surprising to learn that the close of the war found in the United States Assay Office in New York, the largest amount of gold ever collected in any one place. Furthermore, gold is still flowing in this direction and must continue to do so until foreign countries can again send us things which this country needs but does not produce, and thus counterbalance the present condition.

Rates of exchange are, however, merely a reflection of the relative standings of national credits. In the world's markets today a steady improvement in exchange is noted in those countries in which the government is regarded as stable, and which enjoy a reputation for thrift and national integrity. Continuance of this improvement and its spread to other nations depend almost entirely on the curtailment of non-productive expenditures, the increase in the productive effort expended, and the return of confidence in the maintenance of good faith.

In some countries, notably Russia, Austria, and Germany, the currency has been tremendously inflated through the increase in the issuance of paper money which does not

represent a corresponding increase in the gold reserves of the countries responsible for its issue. This "printing-press money" has had a most demoralizing effect on international commerce. Constantly soaring rates of exchange where rehabilitation is most imperative, is evidence of fundamental weakness. Much is being done, however, with a view to reëstablishing normal productiveness, and through this to restore economic equilibrium.

To illustrate: the German government is spending large sums of money for the permanent improvement of its railway system, while in France and Italy great schemes are under way for the utilization of water power, the building of canals, and other public works. France has repaired the damage done to agricultural lands during the war to such an extent that 90 per cent of such lands were available for farming in the spring of 1922. The coal mines in northern France also have been reopened, and the output for 1921 shows an increase of 18 per cent over that of 1920. This, although not a tremendous gain, is encouraging under the circumstances. Finland has recently placed in Belgium the largest order for rails ever issued by the Finnish state railways.

An approach to the restoration of normal conditions, however, after the close of the most all-embracing war and the greatest destruction of life and property the world has ever known, cannot be expected for some years to come. Europe required all of twenty years to recover from the effects of the Napoleonic Wars. But in spite of almost overwhelming odds, the present condition of Europe as a whole is hopeful. Spasmodic local disturbances may occur from time to time, and there will be fluctuations downward as well as upward, but these do not reflect the general tenor of what is going on, nor can they prohibit the slow but certain progress toward normal conditions.

PART III
APPENDIX
REFERENCE TABLES

Table I. Values of Principal Foreign Coins

Country	Monetary unit	Value U. S. gold dol's.	Coins
Argentina	Peso	$0.965	Gold: Argentine ($4.824), ½ Argentine. Silver: Peso and divisions.
Austria and Hungary	Crown	.203	Gold: 10, 20, and 100 crowns. Silver: 1, 2, and 5 crowns.
Belgium	Franc	.193	Gold: 10 and 20 francs. Silver: 1 and 5 francs.
Brazil	Milreis	.546	Gold: 5, 10, and 20 milreis. Silver: ½, 1, and 2 milreis.
British Possessions N. A. except N. F.	Dollar	1.000	
Chile	Peso	.305	Gold: Escudo ($1.825), doubloon ($3.650), condor ($7.300). Silver: Peso and divisions.
China	Tael	.625	Silver.
France	Franc	.193	Gold: 5, 10, 20, 50, 100 francs.
Germany	Mark	.238	Gold: 5, 10, and 20 marks.
Great Britain	Pound Sterling	4.866½	Gold: Sovereign (pound sterling, ½ sovereign. Silver: 1 shilling).
Greece	Drachma	.193	Gold: 5, 10, 20, 50, 100 drachmas. Silver: 5 drachmas.
India, British	Pound Sterling	4.866½	Gold: Sovereign (pound sterling). Silver: rupee and divisions.
Italy	Lira	.193	Gold: 5, 10, 20, 50, 100 lire. Silver: 5 lire.
Japan	Yen	.498	Gold: 5, 10, 20 yen. Silver: 10, 20, and 50 sen.
Mexico	Peso	.498	Gold: 5 and 10 pesos. Silver: Dollar or peso, and divisions.
Netherlands	Florin	.402	Gold: 10 florins. Silver: 2½, 1, and divisions.
Philippine Islands	Peso	.500	Silver: Peso, 10, 20, 50 centavos.
Russia	Ruble	.515	Gold: 5, 7½, 10, 15 rubles. Silver: 5, 10, 15, 20, 25, 50, 100 copecks.
Spain	Peseta	.193	Gold: 25 pesetas. Silver: 5 pesetas.

* Since the World War these values have fluctuated greatly.

Table 2. The Metric System of Weights and Measures

Length

Meter	1.09	yd.
Kilometer	0.621	mi.

Weights

Kilogram	2.204	lbs. av.
Quintal	220.4	"
Tonneau	2,204.6	"

Square Measure

Are	.0247	acre
Hectare	2.47	acres
Sq. Kilometer	.386	sq. mi.

Capacity

Hectoliter (liq.)	26.417	gals
" (dry)	2.837	bu.

Table 3. Tons and Tonnage

In ocean commerce the tonnage of a vessel is expressed in tons—the *vessel* ton and the *cargo* ton.

Vessel Tonnage—

Displacement—Weight of water displaced by vessel when loaded.

Gross Register—Total cubic feet capacity divided by 100.

Net Register—Cubic feet capacity available for cargo and passengers divided by 100.

Cargo Tons—Weight for grains and minerals:

Short Ton = 2,000 lbs.

Long Ton = 2,240 lbs.

Metric Ton = 2,204.6 lbs.

Measurement Ton—For manufactures and general merchandise; 40 cubic feet.

Ton mile—One ton of freight carried one mile.

Table 4. The Area, Population, Railway Mileage,

(For 1920–21, or nearest available year, and based on Statesman's Year Book, U. S. Consular

Grand Division	Area	Population	Population per square mile	Railways
NORTH AMERICA	8,591,164	146,779,375	17.08	323,181
Canada	3,729,665	8,769,516	2.35	83,896
Newfoundland	162,734	265,000	1.62	951
United States	3,026,789	105,710,620	34.92	259,388
Alaska	590,884	55,036	.09	707
Panama Canal	527	22,858	43.37	47
Virgin Islands (West Indies)	132	26,051	197.35	.....
Mexico	767,168	7,000,000	22.15	15,592
Central America except Panama	182,557	5,615,011	30.75	2,877
Panama	33,667	401,428	11.92	257
West Indies				
Cuba	44,164	2,467,883	55.87	3,200
Haiti	10,200	2,000,000	196.07	64
Dominican Republic	19,325	795,432	41.16	153
Porto Rico	3,435	1,299,809	378.40	340
British and Bermudas	12,314	1,885,000	153.07	349
Dutch	403	55,649	138.08	.....
French	1,200	410,082	341.73	.....
SOUTH AMERICA	7,198,094	59,689,483	8.29	53,860
Argentine Republic	1,153,418	8,416,485	7.29	22,590
Bolivia	514,464	1,781,666	3.46	1,354
Brazil	3,276,358	27,473,579	8.38	18,708
Chile	289,796	3,952,475	13.63	5,395
Colombia	476,916	5,472,604	11.47	891
Ecuador	116,000	2,000,000	17.24	365
Guiana (British, Dutch, French)	167,540	464,810	2.77	98
Paraguay	196,000	1,000,000	5.02	266
Peru	533,916	4,620,000	8.65	1,889
Uruguay	72,210	1,650,000	22.85	1,660
Venezuela	393,976	2,852,614	7.24	644
Falkland Islands	7,500	3,250	.43	.....
OCEANIA	3,291,635	8,291,443	2.51	27,232
American				
Hawaii	6,449	255,912	39.68	306
Tutuila and Guam	287	21,331	74.32	.....
British				
Australia and Territory of Papua	3,065,121	5,497,000	1.79	23,772
New Zealand	104,751	1,241,000	11.84	3,134
Fiji and Gilbert Islands	18,533	434,000	23.41	.....
Mandatory Territories[15]	87,300	761,000	8.71	.....
French Possessions	9,194	81,200	8.83	20
ASIA	15,523,332	62,900,879	55.58	75,215
Malay Archipelago				
American Philippines	115,026	10,350,640	89.98	778
British Borneo	77,106	1,000,000	12.95	127
Dutch: Java, Sumatra, etc	683,000	47,000,000	68.81	3,923
Portuguese Timor	7,330	377,815	51.54	.....
Japan Proper	148,756	55,961,140	376.20	6,510
Taiwan (Formosa)	13,944	3,654,398	262.07	345
Chosen (Korea)	84,738	17,284,207	203.97	1,159
Karafuto	13,253	105,765	7.97	.....
Chinese Republic				
The Eighteen Republics	1,532,420	302,110,000	197.15	4,943
Manchuria	363,610	17,812,241	48.98	1,857
Mongolia	1,367,600	1,800,000	1.31	.....
Tibet	463,200	2,000,000	4.31	.....
Sinkiang	550,340	2,000,000	3.63	.....
Russia in Asia				
Siberia	4,831,882	10,377,900	2.14	10,586
Central Asia	1,366,832	11,254,100	8.23	

and Commerce of the Principal Countries of the World.

Reports, U. S. Stat. Abstract, latest U. S. Census, and Bulletin Pan American Union)

	Commerce				
Year	Total Exports	Total Imports	Per cent of exports to U. S.	Per cent of imports from U. S.	Tonnage entered and cleared
....	$6,460,641,302	$4,376,432,527	18.37	31.17	209,083,879
1920–21	976,060,660[1]	905,878,056[1]	43.91	71.04	25,261,000
1921	22,441,267	28,909,727	8.26	33.05	1,712,000
1921	4,485,122,693	2,509,025,403	.....	.....	131,921,052
1920	38,388,973	62,469,096	97.55	96.06	1,256,356
....	.....	.....	.....	.....	11,599,214[8]
1920	1,919,525	2,276,512	82.99	79.24	52,389
1920	213,000,000	178,396,392	91.54	74.79	5,911,000[2]
1919	79,652,200	53,110,600	60.94	74.63	3,547,489[3]
1919	3,757,000[4]	11,407,000[4]	93.05	82.04	.....
1921	278,130,740	356,435,099	80.01	74.50	5,921,000[5]
1920	18,990,032	27,398,411	52.15	83.12	420,474[6]
1919	39,461,000	22,019,000	65.75	95.05	575,985[7]
1920	150,811,449[8]	96,388,534[8]	88.32	94.12	3,924,976[8]
1919–20	95,651,058	89,631,197	25.79	56.43	14,190,000
1920	4,122,197	6,294,200	.....	41.22	1,671,478
1919	53,132,508	26,733,300	0.10	32.84	719,466
....	1,790,861,312	1,611,864,716	31.31	34.97	130,028,637
1921	648,480,000	612,775,000	9.25	17.95	34,818,332[9]
1920	54,000,000	23,000,000	48.14	39.13	.....
1920	385,530,392	459,939,186	41.38	42.53	35,918,320
1920	288,905,301	166,103,810	43.67	30.82	21,297,088
1920	70,371,746	94,225,273	82.56	68.98	428,625[10]
1920	24,181,129	21,035,974	63.06	64.17	377,495
1918	23,473,265	22,825,177	.....	.....	1,376,437[11]
1920	14,510,400	12,724,949	9.31	23.84	708,674[12]
1920	155,000,000	85,000,000	45.80	65.88	1,996,020[13]
1920	83,981,789	50,091,508	25.02	30.52	32,294,349
1920	32,431,499	59,589,129	50.87	58.73	643,297[10]
1918–19	9,995,791	4,554,710	.....	0.45	170,000
....	1,015,960,893	774,858,546	29.24	18.06	16,090,874
1921	180,720,242	90,301,260	98.03	86.08	6,088,689
1920	148,721	590,945	85.34	62.58	.....
1921	556,599,900[14]	522,017,400[14]	4.10	15.85	6,239,000[14]
1919	259,583,592	149,263,805	11 34	24.70	2,986,000
1919–20	11,543,338	6,983,428	41.03	10.38	596,000
....	.....	.....	.....	.....	.....
1918	7,365,100	5,701,708	39.20	25.22	181,185[16]
....	5,229,377,269	4,991,411,443	15.83	12.15	245,538,347
1921	88,105,323	115,838,574	57.70	64.80	3,417,850
1919	14,268,578	10,467,842	.....	.....	963,000
1919	876,880,960	275,700,160	8.97	16.88	4,843,079[10]
1919	274,675	493,513	.....	.....	.....
1921	596,664,098	768,740,319	42.11	30.62	45,943,777[17]
1920	107,807,893	85,959,892	4.76	.....	1,117,899[17]
1921	108,811,195	115,842,220	0.13	5.61	1,117,141
1920	666,206,499[18]	937,567,784[18]	12.39	18.78	95,725,935[17]
1920	221,517,697	156,990,557	.....	.....	.....
....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....

Table 4. The Area, Population, Railway Mileage,

Grand Divisions	Area	Population	Population per square mile	Railways
ASIA—*Continued*				
British Indo-China				
Malay Peninsula	50,992	2,235,000	43.83	1,003
Straits Settlements	1,600	846,000	528.75	
French India and Indo-China	256,196	17,268,728	67.40	1,343
Siam	195,000	8,819,686	42.22	1,333
India Proper	1,093,074	244,267,000	223.47	36,735
Feudatory States	709,555	70,889,000	99.90	.....
Ceylon	25,481	4,758,000	186.72	727
Afghanistan	245,000	6,380,500	26.04	.....
Persia	628,000	9,500,000	15.12	150
Oman	82,000	500,000	6.09	.....
Aden, Perim, Socotra, Hong Kong	10,387	58,000	5.58	.....
Turkey in Asia[19]	173,400	7,000,000	40.36	2,865
Smyrna, Armenia, Mesopotamia, Syria, Arabia[20]	429,350	11,300,000	26.31	.....
Cyprus	3,584	315,000	87.89	76
AFRICA	12,229,482	138,043,763	11.28	29,647
Abyssinia	350,000	8,000,000	22.85	487
Egypt	350,000	12,878,000	36.79	3,051
Morocco (Fr.)	220,540	5,400,000	24.48	.....
Liberia	40,000	2,000,000	50.00	.....
Belgian Congo	909,654	11,000,000	12.09	1,267
British Africa				
Union of South Africa	473,100	7,305,000	15.44	10,049
West Africa	447,500	20,652,000	46.14	1,714
Anglo-Egyptian Sudan	1,014,400	3,400,000	3.35	1,500
Other British Africa	1,208,574	10,392,000	8.59	3,473
Mandatory Territories[22]	748,500	4,400,000	6.54	2,516
French Africa				
Algeria	222,580	5,563,828	24.99	2,221
Tunisia	50,000	1,953,000	39.06	1,044
Other French Africa	4,547,968	28,257,067	6.35	1,370
Italian Africa	185,230	1,100,000	5.93	74
Libya, Tripolitania, Cyrenaica	406,000	6,000,000	14.77	157
Portuguese Africa	927,292	7,734,701	8.34	1,240
Spanish Africa	128,149	844,339	6.58	.....
EUROPE	3,956,144	479,012,702	121.08	210,038
Great Britain and Ireland[24]	121,633	47,000,000	386.40	23,709[25]
Germany[25]	167,516	57,934,763	345.84	38,809
France[26]	212,659	41,475,523	195.03	25,167
Netherlands	12,582	6,841,155	543.72	2,377
Italy[27]	117,982	36,099,657	305.97	9,741
Belgium[28]	11,759	7,637,951	649.54	4,649
Spain	194,783	20,783,844	106.70	9,436
Austria	30,716	6,139,197	199.86	3,882
Hungary	35,164	7,840,832	222.97	.....
Russia in Europe[29]	1,941,117	136,876,707	70.51	35,087[29]
Finland	129,549	3,331,814	25.71	2,685
Switzerland	15,976	3,861,508	41.70	3,915
Denmark	16,566	3,268,807	197.32	2,635
Sweden	173,035	5,847,037	33.79	9,392
Norway	125,001	2,691,855	21.53	2,019
Portugal	35,490	5,957,985	167.87	2,047
Turkey in Europe	1,500	1,000,000	666.66	1,046[33]
Greece[34]	41,933	4,821,300	114.97	1,507
Rumania	122,282	17,393,149	142.23	7,240
Bulgaria	42,000	5,000,000	119.04	1,563
Czechoslovakia	54,438	13,636,390	250.49	8,207
Poland	149,042	24,272,349	162.85	7,295

and Commerce of the Principal Countries of the World.

Year	Total Exports	Total Imports	Per cent of exports to U. S.	Per cent of imports from U. S.	Tonnage entered and cleared
		Commerce			
1919-20	208,184,003	89,908,588	0.72	1.16	2,266,000
1919-20	483,345,647	470,444,595	27.01	5.46	18,885,000
1918	90,785,342	70,960,854	....	.....	4,468,000
1920	20,254,516	52,760,266	2.23	3.01	.....
1920	970,375,320	1,072,422,120	18.14	9.30	13,000,000
....	.....	.....	.....	.....	.....
1919–20	155,328,947	102,712,349	....	.....	17,707,000
....	.....	.....	.....	.....	.....
1918–19	46,385,677	82,780,333	0.87	0.02	1,851,565
1918–19	1,560,020	1,866,726	.....	....	.....
1919–20	540,216,565	481,059,391	9.28	5.75	24,821,000
1920	25,717,476	91,473,948	.....	11.93	10,200,000
....	.....	.....	.....	.....	.....
1919–20	6,676,838	7,421,412	.....	.....	329,000
....	979,711,148	1,151,253,691	10.82	9.44	61,286,682
....	.....	.....	.....	.....	.....
1921	179,711,649	274,539,531	17.94	15.04	25,104,000
1919	44,332,343	93,587,155	2.11	4.23	845,708[21]
1913	1,112,187	1,411,237	0.20	6.86	1,068,108
1918	24,013,554	9,802,595	2.37	6.69	.....
1921	107,046,000	191,984,000	7.37	13.21	7,233,000
1919–20	142,083,334	113,559,777	11.88	15.14	4,936,000
1919–20	17,811,399	24,984,308	.....	.....	.....
1919–20	63,882,545	47,010,390	10.39	5.75	2,563,000
....	.....	.....	.....	.....	.....
1919	259,578,000	182,000,000	0.83	2.53	11,592,351
1919	38,992,000	55,152,000	0.09	7.63	3,202,332[23]
1918	93,121,608	110,797,038	0.89	3.03	1,638,860
1917	4,180,000	9,185,000	5.21	1.64	106,078
1917	1,007,000	11,662,000	.....	.....	2,831,167
1919	2,839,538	26,478,560	7.65	19.17	166,078
....	.....	.....	.....	.....	.....
....	9,875,436,476	15,196,479,232	8.06	17.14	291,166,654
1921	3,118,686,000	4,182,713,000	7.65	22.52	73,108,000
1921	858,292,000	1,062,684,000	9.35	35.03	33,279,000[25]
1921	1,606,870,000	1,755,633,000	8.82	12.81	32,279,000
1921	460,829,000	753,767,000	9.81	23.86	4,843,108
1920	1,519,086,000	3,087,723,000	4.96	12.03	48,237,117
1921	531,639,000	748,440,000	6.62	15.75	20,703,000[28]
1921	108,825,300	168,185,300	24.03	41.14	16,292,713[17]
....	.....	.....	.....	.....	.....
....	.....	.....	.....	.....	.....
1921	8,600,000	68,700,000	.....	.....	11,588,000[29]
1921	73,130,000	77,392,000	.....	.....	1,745,551[30]
1921	305,959,000	390,026,000	13.50	1.98	3,708,027
1921	264,198,000	290,978,000	3.35	13.59	.....
1921	247,322,000	285,406,000	7.99	13.16	16,006,630
1919	156,417,480	516,749,140	4.43	29.14	3,594,853[31]
1919	121,052,484	253,496,580	5.29	7.87	9,778,211[32]
1921	.....	.....	.....	.....	10,189,244[33]
1921	155,228,326	317,987,688	14.00	11.72	773,206
1919	20,029,000	698,797,000	.....	0.94	2,991,095[10]
1919	106,585,000	136,041,000	33.46	9.23	153,089[10]
1920	111,680,000	227,880,000	9.09	3.10	723,212
1921	21,567,745	130,409,983	.....	.....	.....

Table 4. The Area, Population, Railway Mileage,

SUMMARY OF THE LEADING COMMERCIAL

Grand Divisions	Area	Population	Population per square mile	Railways
EUROPE—*Continued*				
Yugoslavia	95,628	11,337,686	118.56	5,684
Lithuania	59,633	4,800,000	80.49	1,550
Latvia	25,000	1,503,193	60.12	1,715
Esthonia	23,160	1,750,000	75.56	.....
British Empire	13,774,522	454,087,898	33.03	151,806
Great Britain and Ireland	121,633	47,000,000	386.40	23,725
Other Europe	120	242,000	2,016.66	8
India	1,802,629	315,156,000	174.83	36,735
Other Asia	322,076	13,457,132	41.78	1,933
Australia and Pacific Islands	3,275,705	7,933,000	2.42	26,906
Africa	4,242,074	59,027,000	13.91	22,303
America	4,010,285	11,272,766	2.81	40,196
United States and Possessions	3,743,529	117,859,495[35]	31.51	261,810
Continental U. S.	3,026,789	105,710,620	34.92	259,388
Alaska	590,884	55,036	0.09	951
Porto Rico	3,435	1,299,809	378.40	340
Hawaii, Guam, Tutuila, Virgin Is.	6,868	303,294	44.16	306
Philippine Islands	115,026	10,350,640	89.98	778
Panama Canal	527	22,858	43.37	47
French Republic	5,612,337	103,458,428	18.43	34,196
France	212,659	41,475,523	195.03	25,167
Indo-China and Asiatic possessions and mandates	316,196[36]	20,268,728[36]	64.10	1,343
Morocco and African colonies and mandates	5,041,088	41,173,895	8.16	7,686
French Guiana and possessions in N.A.	33,200	459,082	13.82	.....
Pacific Islands	9,194	81,200	8.83	.....
Italy (Kingdom of)	709,212	44,617,970	62.91	9,972
Italy	117,982	36,099,657	305.97	9,741
Possessions in Africa and Asia	591,230	7,110,017	12.02	231

NOTES

1. For year ending September, 1921.
2. 1912 figures Tampico and Vera Cruz.
3. Figures for Nicaragua are entered only.
4. Commerce of Canal Zone and parcel post not included.
5. Havana only.
6. 1916.
7. 1919, entered only.
8. For year ending June 30, 1920.
9. 1918.
10. Entered only.
11. British and Dutch only.
12. Ascuncion, 1919.
13. Callao, 1919
14. Rate of exchange $4.35. Papua not included; exports, 1919, $1,174,000; imports $1,840,050. Tonnage, 1918–19.
15. Includes New Guinea, Bismarck Archipelago, Solomon Is. and Samoa.
16. New Caledonia, only, 1919.
17. 1919.
18. Per cent to U. S. is for 9 mos. only.
19. Estimated area and population.
20. Includes British and French mandates.

Table 5. Rail and Inland Water Transportation in

	United States (1920)	Great Britain (1920)	France (1920)
Railways—mileage	259,388	20,290	38,809
Railways per 1,000 square miles	85.71	227.97	183.06
Railways per 10,000 population	24.53	4.77	9.38
Water ways—mileage	28,400	3,825	8,782
Water ways per 1,000 square miles	9.38	42.97	41.42
Water ways per 10,000 population	2.68	.89	.11
Tonnage—by rail in millions of tons	2,305.82	304.9	206.58
Tonnage—by water in millions of tons	258.00	23.02	42.02
Tonnage % total by rail	89.94	92.98	83.09
Tonnage % total by water	10.06	7.02	16.91

*No statistics available for comparison since World War.

and Commerce of the Principal Countries of the World

AND COLONIAL COUNTRIES

Year	Total Exports	Total Imports	Per cent of exports to U. S.	Per cent of imports from U. S.	Tonnage entered and cleared
1921	43,660,000	.....	.....	.....	.....
1920	10,435,943	8,574,570	.....	.....	.....
1920	7,850,220	15,044,753	0.17	1.80	935,795
1920	17,544,278	19,931,218	.....	.....	293,803
....	7,768,584,286	8,256,343,111	17.21	19.00	219,881,000
1921	3,118,686,000	4,182,713,000	7.65	22.52	73,108,000
1919–20	4,472,313	20,747,416	.....	.....	3,574,000
1920	970,375,320	1,072,422,120	18.14	9.30	13,000,000
....	1,408,020,578	1,162,014,177	6.15	2.06	64,008,000
....	827,726,830	678,264,633	18.82	16.97	9,821,000
...	330,823,269	376,638,475	7.41	8.52	14,732,000
....	1,108,479,976	1,033,543,290	45.11	54.66	41,638,000
....	4,945,217,326	2,876,390,324	.....	.....	158,260,526
1921	4,485,122,693	2,509,025,403	.....	.....	131,921,052
1920	38,388,973	62,469,096	97.55	96.06	1,256,356
1920	150,811,449	96,388,534	88.32	94.12	3,924,976
1920–21	182,788,888	93,168,717	88.78	75.96	6,141,078
1921	88,105,323	115,838,574	57.70	64.80	3,417,850
....	.....	.....	.....	.....	11,599,214
....	2,200,707,328	2,308,241,373	10.40	17.65	54,870,902
1921	1,606,870,000	1,755,633,000	8.82	12.81	32,223,000
1918	90,785,342	70,960,845	.....	.....	4,468,000
1918–19	436,023,951	441,436,193	3.92	17.42	17,279,251
1919	59,662,935	34,509,618	0.10	32.84	719,466
1918	7,365,100	5,701,708	39.20	25.22	181,185
....	1,524,273,000	3,108,570,000	5.08	6.83	51,174,362
1920	1,519,086,000	7,3,08723,000	4.96	12.03	48,237,117
1917	5,187,000	20,847,000	5.21	1.64	2,937,245

NOTES (Cont.)

21. 1919, entered only.
22. Includes Tanganyika Territory, South-west Africa, Togo, part of Cameroons,
23. 1917.
24. Does not include Malta and Gibraltar, area, 120 sq. mi., population, 242,000.
25. Includes Upper Silesian plebiscite area. Old area. Hamburg, Bremen, Bremnerhaven, 1913.
26. Includes Alsace-Lorraine.
27. Includes area gained by World War.
28. Includes area ceded by Germany. Antwerp only, 1920.
29. Includes Ukrainia. Old area. From six leading ports, 1914–15.
30. 1918.
31. From four leading ports, 1919.
32. 1918, entered only.
33. Area after Balkan War. Constantinople, 1921.
34. Does not inclued 9,400 sq. mi. still in dispute; population, 700,000
35. Includes 117,258 military and naval, services abroad, etc.
36. Includes Syrian mandate.

Some of the Principal Commercial Countries

Belgium (1920)	Canada (1920)	Germany* (1912)	Austria-Hungary* (1912)	Russia in Europe* (1912)
4,649	38,896	37,823	48,251	35,987
422.63	10.43	181.16	199.80	17.20
6.09	44.40	5.83	9.76	2.40
1,238	2,700	8,564	7,784	116,891
108.85	.72	41.01	32.23	55.85
1.67	3.08	1.32	1.57	7.78
72	116.62	675.04	242.84	227.75
58.8	52.05	113.9	10.36	33.60
55.05	68.77	85.56	95.91	87.14
44.95	31.23	14.44	4.09	12.86

Table 6. Commerce of the United States with Foreign Countries and with Non-contiguous Territory by Classes of Commodities

(Latest available figures from U. S. Statistical Abstract, and Monthly Summary of Commerce and Finance.)

A. EXPORTS FROM UNITED STATES. (Values in Millions of Dollars.)

Grand Divisions	Foodstuffs, crude, and food animals	Foodstuffs, wholly or partly manuf'd	Raw materials for use in mfg.	Materials partly manufactured	Finished manufactures	Miscellaneous	Totals
To No. America...	33.35	61.70	97.76	95.48	301.94	5.75	595.98
To So. America...	1.84	13.38	2.64	28.11	99.66	.10	145.73
To Oceania.....	.98	6.34	3.58	9.96	58.04	.05	78.95
To Asia.....	3.73	11.31	30.29	9.31	60.12	.02	114.78
To Africa.....	3.18	3.60	2.83	2.29	17.07	.10	29.07
To Europe.....	138.83	224.87	594.66	263.66	239.47	2.51	1,464.00
Total values....	181.91	321.20	731.76	408.81	776.30	8.53	2,428.51

B. IMPORTS INTO UNITED STATES. (Values in Millions of Dollars.)

From No. America	49.28	102.91	123.80	54.13	30.64	1.18	361.94
From So. America.	113.33	.84	71.91	29.44	2.10	.13	217.75
From Oceania.....	1.58	4.90	23.17	4.85	3.00	.04	37.54
From Asia.....	21.09	9.01	147.85	43.52	54.55	.47	276.49
From Africa.....	.22	.01	25.76	.17	.16	.10	26.42
From Europe.....	26.25	76.57	242.72	217.29	317.73	12.31	892.87
Total values....	211.75	194.24	635.21	349.40	408.18	14.23	1,813.01

C. EXPORTS FROM UNITED STATES. (By per cent of Total Value.)

To No. America...	1.37	2.54	4.02	3.93	12.43	.237	24.53
To So. America...	.08	.55	.11	1.16	4.11	.004	6.01
To Oceania.....	.04	.26	.15	.41	2.39	.002	3.25
To Asia.....	.15	.47	1.25	.38	2.48	.001	4.73
To Africa.....	.13	.15	.11	.09	.70	.004	1.18
To Europe.....	5.72	9.26	24.49	10.86	9.86	.103	60.30
Total per cents .	7.49	13.23	30.13	16.83	31.97	0.351	100.00

D. IMPORTS INTO UNITED STATES. (By per cent of Total Value.)

From No. America	2.72	5.68	6.83	2.99	1.69	.065	19.97
From So. America.	6.25	.05	3.97	1.62	.11	.007	12.01
From Oceania.....	.09	.27	1.28	.27	.16	.002	2.07
From Asia.....	1.16	.50	8.15	2.40	3.01	.025	15.24
From Africa.....	.01	.0005	1.42	.01	.01	.006	1.46
From Europe.....	1.45	4.22	13.39	11.98	17.53	.679	49.25
Total per cents..	11.68	10.72	35.04	19.27	22.51	.784	100.00

E. EXPORTS FROM UNITED STATES TO NON-CONTIGUOUS TERRITORY (Values in Millions of Dollars.)

To Alaska	1.50	4.86	.27	2.40	11.07	.08	20.18
To Hawaii	1.74	4.71	.81	3.64	19.23	.28	30.41
To Philippines....	.57	3.65	.11	1.82	19.20	.006	25.36
To Porto Rico....	6.08	7.82	.72	2.44	15.09	.07	32.22
Total values....	9.89	21.04	1.91	10.30	64.59	.436	108.17

F. IMPORTS INTO UNITED STATES FROM NON-CONTIGUOUS TERRITORY (Values in Millions of Dollars.)

From Alaska.....	.55	17.45	4.65	...	.35	.006	23.01
From Hawaii.....	.63	40.61	.26	.05	.11	...	41.66
From Philippines..	...	5.64	12.19	.11	2.99	...	20.93
From Porto Rico..	3.16	27.39	3.35	.03	6.08	.01	40.02
Total values....	4.34	91.09	20.45	.19	9.53	.016	125.62

THE INDEX

All figures refer to pages; heavier type is used for the more important references.

Abacá, 90, 225, 227.
Aberdeen, 400.
Abrantes, 379.
Abyssinia, 346, **353;** coffee, 89, 353; commerce, 353.
Acadia, 245.
Acapulco, 260.
Acre, 342.
Adana, 343.
Adelaide, 295, 297, 298.
Adelsberg Pass, 385.
Aden, 336; British naval station, **337,** 406.
Aderar, 352.
Adirondacks, 112, 117, 122.
Adrianople, 368.
Adriatic, 364, 366, 367, 382, 385.
Ægean Sea, 339, 367.
Afghanistan, 331, 332; commerce, 333, 334, 436.
Africa, 8, 30, 34, 86, 250, 328, **344-359,** 396, 406; climate, 346; coast line, **24, 346;** coffee, 272, 354; exports, 8, 353, 354; inhabitants, 344; irrigation in, 345, 348, 350; gold, 203, 356; human porterage in, 64; map (Fig. 230), between 344, 345; horn of, **353;** equatorial, commerce of, **354; North,** 86, **349-352;** commerce, **351, 352;** exports, 351; imports, 351; minerals, 351; products, **351; South,** 81, 405; climate, 356; commerce, **358;** commerce of British (Fig. 237), 358; exports, 358; other resources, 83, **356;** products of the soil, **355, 356;** trade routes and trade centers, **357;** "white man's," **354, 355.**
African Islands, in Atlantic, **358, 359;** Indian Ocean, **359.**
Agassiz, Lake, glacial, 18, 150.
Agate, 188.
Agaves, 257; cutting agave leaves for sisal fiber in Yucatan (Fig. 177), 257.
Agram, see **Zagreb.**
Agricultural implement industry, 122, 158.
Agriculture, first developed, 3, 5; primitive woman first in, 5; primitive man despised, 5; made possible growth of commercial and manufacturing cities, 5; civilization based on, 15; how lowlands affect, **17, 18;** upland valleys affect, **19, 20;** mountains affect, **20;** results of law of decreasing returns in, 57; imposes restrictions on man, 83, 84; tended to preserve race integrity of English in America, 103; Indian squaw's method, 105; Northern and Southern types of, **105, 106;** in North Atlantic, South, North Central, and West [U. S.] (Fig. 64), 111; westward migration of U. S. centers (Fig. 98), 157; industry of U. S. (Fig. 134), 200; exports [U. S.], why they must eventually decline, **201, 202;** law of decreasing returns in, 202; possibilities of Alaska **213, 214;** in Philippines, **225;** scientific methods of Germany, 420; for agriculture in other countries, see under the country; see also **Soil.**
Aguascalientes, 259.
Air nitrates, 410.
Airplane (Fig. 33), 71.
Aix-la-Chapelle, 421, 423.
Akron, 106, 160.
Alaska, 25, 29, 195; agricultural possibilities, **213, 214;** character of, **210;** commerce, **214, 215;** exports, **214;** (Fig. 147), 214; fisheries and forests, **210-212;** fisheries and minerals (Fig. 144), 211; fur farms, 210; homestead unit, 214; imports, 214; map (Fig. 129), facing 197; mineral resources, **212, 213;** mountains, **210;** transportation, **215, 216.**
Alaskan islands, importance to U. S., 216.
Albanians, 363.
Albany [Australia], 298; [N.Y.], 107, 122, 129.
Albula Tunnel, 389.
Alcohol, 90, 160, 392.
Aleppo, 6, 342.
Alexandretta, 342, 343.
Alexandria, 8, 11.
Alfalfa, 282.
Algeria, 171, 349, 350, 351, 397; products, 351.
Allegheny, 122; **River,** 107; **Plateau,** 18, 112, 115, 120.
Allentown, 122.
Allied and Associated Powers, 429.
Alligator, 81.
Allspice (Pimento), in Jamaica, 264.
Almaden, 378.
Almeria, 378, 379.
Almonds, 36, 85; Iberian Peninsula, 378; Italy, 372; Morocco, 351; U. S., 183; harvest (Fig. 117), 184.
Aloe fiber, 359.
Alpaca, 65, 83, 270.
Alps, 360, 361, 367, 379, 381, 386, 389, 393, 413; mineral district, 383; railways, 374; tunnels, 13, 374, 385, 389; water power, 371.
Alsace-Lorraine, 393, 397.
Altoona, railway cars, 122.
Aluminum, Switzerland, 388; U. S., **122.**
Amapala, 261.
Amazon River, 18, 34, 268, 272, **277,** 286.
Amber, 8, 11, **421.**
Ambergris, 263.
American expansion, causes of, **229;** in the Caribbean, **229-242;** in the Pacific, **210-228.**
American Mediterranean, 254.

American people, 103, 104.
Ammunition, 119.
Amoy, 318.
Amsterdam [Neth.], 74, 414, **415, 416;** [N. Y.], 118.
Amur River, 435, 436.
Anatolia (Asia Minor), 8, **338,** 339, 340, 341; ports, 343.
Anchovies, Mediterranean, 373, 378.
Anderson [Ind.], 165.
Andes Mountains, 65, 83, 268, 271, 278, 280, 281, 285, 286; climate, fertility, 268, **269;** minerals, 283; population, **270;** products, 273; railways, 277; water power, 276.
Andorra, 362, **380,** 397.
Anegada Passage, 266.
Angola, 356.
Angora goats, Turkey-in-Asia, 339; in the dry Southwest [U. S.] (Fig. 40), 82.
Animal fibers, 81, 83.
Animals, domestic, in China, 314; wild, uses of, **78.**
Annam, 326.
Annatto, 264.
Ansonia [Conn.], 119.
Antilles, greater, 254; lesser, 262, 263, **264.**
Antimony, in China, 315; France, 393; Greece, 365; Japan, 304; Turkey, 341.
Antioch, 8, 10.
Antofagasta, 287; line, 285.
Antwerp, commercial museum and school of commerce at, 416; important as seaport, 404, 453; as market, 12, 415, 417.
Anzacs, 294.
Anzin, 394; coal field, 392.
Aparri, 228.
Apennines, 371, 374, **376;** lignite and petroleum in, 373.
Apia, 293.
Appalachian Mountains, 98, **99, 100,** 130, 140, 145; coal fields of, 160; as a barrier to development of the country, 101, 106, 107, 108.
Apples, 86; in Canada, 245, 246; France, 392; Tasmania, 296; U.S., 140, 183, 200.
Apulia, 371.
Aqueducts, built by Romans, 70.
Arabia, 35, 328, **336,** 352; commerce, **337;** exports, 8, 336, 337; products, **336, 337.**
Arabs, their importance in commerce, 3, **337;** Arab plowing in North Africa (Fig. 235), 350.
Archangel, 437.
Ardennes Plateau, 413, 414, 429.
Areas of principal countries, xiv.
Argentina, 83, 269; climate, 280; commerce (Fig. 192), 288; forests, 281; harbor, 287; minerals, 283; population, 270; products, agricultural, 282, 285, 288; railways, 285, 286; stock raising, 83, 281, 288; the U. S. of S. Am., 286.
Arica, 285; nut, 224.
Arlberg Tunnel, 385, 389, 395.
Armenia, 335, 435.
Artesian well, at Woonsocket, S. Dakota. (Fig. 104), 171; artesian wells in Sahara, 352.
Asbestos, Quebec, 248; Siberia, 433.
Ash, 151.
Ashtabula, 164.
Asia, 35, 36, 250, 396, 430; coffee, 272; fur, 198; gold, 203; map (Fig. 201) between 300, 301; silk, 83; opium, 89; **Southern, 324-334; Western, 335-343;** why western Asia is of special interest, **335;** trade routes, **342-343.**
Asia Minor, see **Anatolia.**
Asiatic empires, 430.
Asphaltum, in California, 187; Cuba, 237; France, 393; Switzerland, 387; Trinidad, 264; Turkey, 341; Utah, 187, Venezuela, 275; U. S., southern, 143.
Assafœtida, 333.
Assam, 331.
Astoria, 177.
Astrakhan, 437.
Asuncion, 287.
Aswan, 349; down-stream fall of Aswan dam (Fig. 234), 348.
Atacama Desert, 283.
Athabaska River, 245, 248.
Athens, 8, 28, 193, 364, 365.
Atlanta, 27, 145, **146,** 147.
Atlantic, highway of commerce, **13,** 100.
Attar of roses, 367, 368.
Auburn, 115, 122.
Augsburg, 423, 426.
Augusta, 145.
Aukland, 292, 293, **298.**
Aurora, 164.
Aussig, 384.
Australasia, British, **293, 294;** colonies and commerce, **298, 299;** commercial centers, **297, 298;** crops, **295, 296;** exports, **298, 299;** forests and fisheries, **294;** manufactures, **296, 297;** minerals, **296;** stock industry, **294, 295;** surface and climate, **294;** transportation, **297.**
Australia, 30, 31, 35, 81, 83, 194, 221, 250, 292, 293, 405; crops and commerce, **295, 296,** 297 299, (Fig. 198), minerals, 203, 299; traction engine and wagon in (Fig. 28), 66; transportation, 65, **66,** 297.
Austria, see Austria and Hungary.
Austria and Hungary, 381–385, 427; commerce, **384, 385;** exports, 384, 409, 441, 442 (Fig. 249), 384; fisheries, **382, 383;** government, 381; imports, 384; manufactures, **383;** map (Fig. 248), 382; minerals, 203, 378, 383; population, 201, 381, 450; possessions, **385;** products, **381, 382;** transportation, and trade routes, **384, 385,** 452, xix; water power, 383; conflict between, 42, 381, 384.
Automobile industry, 164.
Azores, 378.

Babylon, 6, 38, 339, 340, 342.
Bacon, Ireland, 399; Denmark, **411.**
Bagdad, 6, 11, 334, 343.
Baguio, 223.
Bahamas, 262, **263.**
Bahia, 273, 274, 279.
Bahia Blanca, 287.
Baku, 433, 435, 439.
Balata, 271, 273.
Balboa, 241; steel pier at (Fig. 193), 289.
Balkan Mountains, 368, 369, 370.
Balkan Peninsula and Rumania, 363-370, 427; map (Fig. 242), 362; why undeveloped, **363, 364.**
Balkh, 11.
Balsam copaiba, 271.
"Balsam of Peru," 256.

Baltic Sea, 11, 360, 384, 410, 411, 421, 426, 427, 434, **437,** 439.
Baltimore, 27, 112, 114, 119, 122, 123, **125, 126,** 128, 155.
Baluchistan, 327, 332.
Bamboo, China, 312, 316; India, 329; Japan (Fig. 203), 302; Philippines, 224.
Bananas, 85; Australia, 296; Ceylon, 329; Cuba, 236; Fiji, 293; Haiti, 265; Hawaii, 218; Jamaica, 264; Middle America, 256; Panama, 239; Philippines, 225; Porto Rico, 232; S. America, 275, 278; Sudân, 352.
Banat, 369.
Bander Abbas, 334.
Banff, 248.
Bangkok, 327.
Bangor, 112.
Banking System, 47.
Baracoa, 237.
Barada, gorge, 342; River, 341.
Barbados, 230, **264,** 266, 406.
Barbuda, 264.
Barcelona, 278, 377, **378,** 379, 395.
Bariloche, 285.
Barley, 87, 88; Africa, 351; Alaska, 214; Austria and Hungary, 88, 382; Canada, 88; Chile, 282; Egypt, 346; Germany, 88, 421; Great Britain, 88, 399; Greece, 365; Iberian Peninsula, 377; Iranian Peninsula, 333; Ireland, 402; Italy, 371; Japan, 88, 303; New Zealand, 296; Norway, 409; Russia, 88; Scotland, 402; S. America, 273; Spain, 88, 377; Syria, 340; Tasmania, 296; U. S., 88, 154, 181; world crop (Fig. 44), 88.
Barmen-Elberfeld, 423.
Barquisimeto, 278.
Barranquilla, 278.
Barrios, 260.
Barrow-in-Furness, 401, 402.
Barter, origin of, 1.
Basle, 388, 389, 425.
Basra, 343.
Basswood, 151.
Batavia, 325.
Bath, 119.
Batum, 435.
Bauxite, 393.
Bavarian Plateau, 421.
Bay City, 157.
Bay trees, 266.
Bayonne, 120, 126.
Beans, 114; Africa, 351; China, 313–315, 321; Chosen, 308; Egypt, 346; Italy, 371; Manchuria, 314; Middle America, 257; Porto Rico, 231; S. America, 273; U. S., 155; **castor,** Cape Verde Islands, 358.
Beaver, in Canada, 245.
Beef Extract, S. America, 284.
Bee-keeping industry, 80, 420; Austria, Hungary, 381; Switzerland, 387; U. S., 174.
Beer, 90; Milwaukee, 160; St. Louis, 160; Munich, **424;** Czechoslovakia, 383.
Beeswax, Africa, 353; Cuba, 236; Haiti, 265; Madagascar, 359.
Beet sugar, see **Sugar, beet.**
Beira, 357.
Beirut, 6, 340–342.
Belfast, 402, 403, 405.
Belfort Gap, 389, 395.
Belgian coal fields, 414.
Belgian Congo, 272, **417.**
Belgium, 413; commerce (Fig. 265), 416; exports, 413, 416; imports, 416; industrial education, 416; manufactures, **414;** map (Fig. 263), 412; minerals, 203, 414; natural resources, **413;** occupations of people, 451; population, 450, 451; railway mileage (Fig. 289), 452; trade routes and centers, **414, 415;** transportation, rail and inland water, xix.
Belgrade, 369, 383.
Bellingham, 195.
Bengal, 324, 331.
Benguet Highlands, 226.
Beni River, 278.
Benue River, 354.
Benzine, 96.
Benzoin, 325.
Berber, 346, 349.
Berbera, 353.
Berea grit, 165.
Bergen, 408, 410.
Bering River, 213; **Sea,** 198, 215; **Strait,** 301.
Berkshire Hills, 123.
Berlin, 375, 379, 389, 395, 396, 412, 415, **426,** 427.
Bermudas, 25, 262, **263.**
Beryl, 188.
Besançon, 394.
Betel leaf, 224.
Bethlehem, 122.
Bhutân, 327.
Bielefeld, 423.
Biella, 373.
Big Horn River, 177.
Bilbao, 379.
Binghamton, 115.
Birch, in U. S., 151; Canada, 245.
Birmingham [Ala.], 21, 145, 148; [Eng.], 403, 414.
"Black belt," 130.
Black Forest, 426; industries of, 422, 424.
Black Hills, 100, 161.
Black Sea, 11, 335, 343, 360, 369, 370, 384, 434, 435, 437, 438; ports, 370.
Black-waxy region, 140, 144.
Blankets, Africa, 351; Mexico, 259.
Bleiberg, 383.
Bloomington, 159.
Blue grass district, 131, 134, 135.
Blue Ridge, 20, 99, 142, 146.
Bogotá, 269, 273, 275, 277, 278.
Bohemia (Czechoslovakia), products, 381, 382; minerals, 383.
Bois Brulé, 106.
Bolivia, 273, 276, 277, 278, 285–287; minerals, 275, 283.
Bologna, 372, 374.
Boma, 354.
Bombay, 331.
Bône, 351.
Borate of lime, 284.
Borax, California, 188; Italy, 373.
Bordeaux, 392, 393, 395, 396.
Borneo, 324, 325, 406; "edible birds' nests," 325.
Bosnia (Serb-Croat-Slovene Kingdom), 385.
Bosporus, 343, 368, 438.
Boston, 25, 27, 112, 114, 117, 118, 124, 245; harbor, map (Fig. 74), 124.
Boulogne, 396.
Bounties, government, 44.

Braddocks Trail, 107.
Bradford [Eng.], 402; [Pa.], 120.
Brahmaputra River, 331.
Braila, 370.
Brandy, 90, 367; Cognac, 392.
Brass, 93, 119, 122.
Brazil, 34, 269, 270, 277, 279, 280, 282, 285; cocoa, 272, 273, 288; coffee, 201, 272, 273, 274, 288; coffee trust, 274; commerce, 290 (Fig. 192); manufactures, 276; minerals and precious stones, 275, 283, 330; ports, 286; rubber, **272,** 288; tapioca, 86.
Brazil nuts, 271.
Brazil wood, 271.
Breadfruit, 85.
Bremen, 418, 427.
Bremerhaven, tobacco market, 427.
Brenner Pass, 375, 446.
Breslau, 420.
Brest, 28.
Brick, 123, 165; invention of, 92.
Bridgeport, 119.
Brindisi, 365, 375.
Bringing goods to market on sailing wheelbarrows (Fig. 214), 317.
Brisbane, 297, 298.
Bristles, 200.
Bristol, 405.
British Columbia, 248.
British Isles, see **Great Britain.**
Brittany, 363, 393, 396.
Brockton, 117, 160.
Broken Hill, 356.
Bronze goods, 394.
Brookline, 124.
Brooklyn, 114.
Bruges, 74, 413, **415;** ancient trade center, 12, 415.
Brusa, 340, 341.
Brussels, 414, 416.
Bucharest, 370.
Buckwheat, **88;** France, 392; U. S., 113.
Budapest, 384, 385.
Budejovice, 383.
Buenaventura, 270.
Buenos Aires, 27, 277, 280, 282, 285, **286.**
Buffalo, 108, 114, 122, 124, 128, **129,** 167, 169, 254.
Bukhara, 436, 439; rugs, 433.
Bukovina, 369.
Bulgaria, **367, 368,** 369, 370.
Buluwayo, 357.
Burgas, 370.
Burlington [Iowa], 157; [Vt.], 112.
Burma, 326, 332; rice, teak, 329; rubies, jade, 330.
Bushire, 334.
Butte, 91, 185, 188, 193.
Butter, 55, 80, 114; Australia, 80; Canaries, 358; Denmark, 80, 411; Finland, 80; France, 80; Ireland, 399; Netherlands, 80; New Zealand, 80; Russia, 80, 431, 438; Sweden, 80, 409.
Butterine, 55.
Buttons, 158.

Cabbage, 114.
Cable centers, 222, 266.
Cable routes, map (Fig. 52), 88.
Cabuyaro, 277
Cadiz (Gades), 7, 379.
Cairo, 349.
Calais, 394, 396.
Calcutta, 241, 330, **331.**
Callao, 279.
Cambodia, 326.
Cambridge, 124.
Camden, 116, 118.
Camels, in Asia, 315; Iranian Plateau, 332; Russia, 432; Sahara, 352; Turkey-in-Asia, 339; **caravans,** 65.
Camphor, in Ceylon, 330; Florida, 142; Taiwan, **302.**
Campos, 34, 268, 270.
Camwood, 354.
Canada, **243-253,** 405; cheese, **246;** climate and surface, 37, **243, 244;** commerce, **252, 253** (Fig. 174), 252; commercial centers, **250–252;** exports, 199, 252, 409; farming in, **245–247;** fisheries, **244, 245;** forest products, 199, 202, **245;** fur, 78, 198, **245;** imports, 252; land under grass and crops (Fig. 173), 247; making of, **243;** map (Fig. 180), facing 268; manufactures, **44, 248, 249;** minerals, 203, **247, 248,** (Fig. 173), 247; parliament, 243; population (Fig. 173), 247; postal rates, 61; transportation, 240, **249, 250,** xix; U. S., relations to, 252, 253; as world granary, 282.
Canals, **73;** controlled by railroads, **128;** in France, 394, 395; Great Britain, 403; Hungary, 384; Netherlands, 415; U.S., **127–128;** Mississippi system, **166;** ship canals, **73, 74,** 124, 427.
Canal Zone, see **Panama Canal.**
Canary Islands, 359, 378; exports, 358.
Candles, 158; in France, 394.
Cane Sugar, see **Sugar, cane.**
Canning industry, United States, 190.
Canton [China], 315, **318;** [Ohio], 164; River, 121.
Cape Cod Canal, **124.**
Cape-to-Cairo Railway, 354, 357.
Cape Town, 357.
Cape Verde Islands, 358, 359.
Cap Haitien, 265.
Caracas, 269, 273.
Caravan, near walls of Peking (Fig. 2), **4.**
Cardenas, 237.
Cardiff, 404.
Caribbean Sea, 234; ports of, 278.
Carobs, in Cyprus, 340; Greece, **365;** Iberian Peninsula, 377.
Caroline Islands, **222,** 291–293
Carp, German, 421.
Carpathian Mountains, 360, 369, 383.
Carpets, in Africa, 351; Brussels, 414; France, 394; Great Britain (Kidderminster, Wilton), 402; Russia, 434; Turkey, 368; U. S., 118.
Carrara marble, 373.
Cars, 70, 122, 389.
Cart, influence of its invention, 66.
Cartagena, [S. Am.], 278; [Spain], 379.
Carthage, 7, 8, 351.
Carving, in jade, ivory, wood, 315.
Cascade Mountains, 21, 101, 102.
Cascades, the, 190.
Cascalote pods, 259.
Cashmere shawls, in Ceylon and India, **331.**
Cash register, 164.
Caspian Sea, 95, 433–438.
Cassava, 272, 273.
Cassia, in China, 313.

Castor beans, India, 329; **plant,** China, 315.
Castries Harbor, 264.
Cattle, 79, **81;** in Alaska, 213; Argentina, 83; Australasia, 295; Canada, 247; Central America, 256; Central Europe 81, 381; Ceylon, 81; Channel Islands, 399; Cuba, 235; France, 391; Germany, 81, 420; Great Britain, 399; Hawaii, 217; Iberian Peninsula, 377; India, 81; Italy, 371; Madagascar, 359; Montenegro, 368; Netherlands, 413; New Caledonia, 293; New Zealand, 295; Oklahoma, 134; Porto Rico, 231; Rumania, 369; Russia, 81; Scandinavian Peninsula, 409; Serbia, 367; Africa, 356; S. America, 81, 281; Sudân, 352; Texas, 113, 134; U. S., 81, 156, 172, 189; (Fig. 39), 81.
Caucasus Mountains, 360.
Caucho, 272.
Caviare, 433.
Cawnpore, 331.
Cayey, 231.
Ceará, 279; rubber, 272.
Cebu, 228.
Cedar, in Cuba, 235; Japan, 302; Middle America, 256; Porto Rico, 231; U. S., 175; **Cedars of Lebanon,** 7.
Cedar Rapids, 159.
Celery, 155.
Celluloid, 302.
Cement, Portland, 123; (Fig. 73), 123.
Central America, 35, 148, 149, 240, **254–262;** climate and surface, **254;** commerce, **261, 262,** 272; inhabitants, **255;** map (Fig. 194), facing 290; manufactures, **259;** minerals, 203, 258; products of the soil, **256–258,** 272; resources, other natural, **258;** transportation, 259–261.
Central Plain, 98, **100.**
Cereals, 87, **88.**
Cerro de Pasco, 275.
Ceuta, 350, 380.
Ceylon, **327–331,** 406; animal products, **328, 329;** climate and surface, **328;** exports, 312, 329; minerals, 330; products of the soil, 329, 330. Value of graphite mined (Fig. 224), 330.
Chambly Canal, 249.
Champagne, 10, 394.
Champlain, Lake, 99, 106, 112, 127, 249.
Channel Islands, 399, 405.
Charcoal, **120.**
Charleroi, 414, 415.
Charleston, 143, 146.
Charlotte, 145.
Chattanooga, 144, 146, 147.
Cheb, 383.
Cheese, **80;** Canada, 80; France, 80; Italy, 80; Netherlands, 80; New York, 114; Ontario, 246; Switzerland, 80; 387; U. S., 80.
Chefoo, 320, 322.
Chelsea, 118.
Chemical industry, Great Britain, 403; Germany, 424, 449; U. S., 206, 424.
Chemnitz, 424.
Chemulpho, 309.
Chesapeake and Delaware Canal, 146.
Chesapeake Bay, 25, 109, 112, 114, 128, 146.
Chester, 122.
Chestnuts, 85; France, 391; Iberian Peninsula, 377; Italy, 371; U. S., 133.
Chicago, 27, 106, 108, 129, 158, 159, 160, 164, 167, **168,** 169, 250, 252; **Drainage Canal,** 167; **River,** 106, 166.
Chick-peas, Africa, 86, 351; Spain, 86, 377; Italy, 372; Mexico, 257.
Chicle, Central America, 256; Germany, 421.
Chicory, 413, 421.
Chihli, Gulf of, 319, 322.
Chihuahua, 258.
Chile, 241, 269; climate, physical features, 280, 287; commerce, **287–289;** exports, 281, 283, 284; forests, 281; manufactures, **284;** minerals, 283, 296; nitrate industry, 54, 92, 283, **284;** products, **281,** 282; railroads, 285.
China, "Dresden," **424.**
China, Republic of, 10, 11, 47, 60, 83, 89, 90, 132, 142, 241, 250, 307, **310–323,** 361, 362, 436, 437; agriculture, 56, **312–315;** animals, domestic, 314; centers, commercial, **318–320;** commerce, **320, 321,** (Fig. 216), 321; exports, 320, 321, 322; fisheries and forests, **312;** foreign possessions, **321–323;** human porterage in, 64; imports, 321; loess, beds of, **17;** manufactures, **315–316;** map (Fig. 209), 311; merchant guilds, **320;** mineral resources, **315;** national characteristics, 5, 40, 41, **310;** physical features, 35, **310–312;** transportation, **316–318.**
"China wax," 312.
Chinchilla, 281.
Chinkiang, 319.
Chinnampo, 309.
Chinook winds, 30.
Chocolate, 89; Netherlands, 414; Switzerland, 387, 389.
Chosen (Korea), 307, **308, 309,** 322, map (Fig. 199), 300; products, 308; trade routes, 309.
Christiania, 409, 410; **Bay,** 410.
Chrome, Greece, 365; New Caledonia, 293.
Chromium, Turkey, 341.
Chunking, 319.
Cider, 90.
Cienfuegos, 238.
Cigarettes, in Egypt, 348.
Cigars, Philippines, 226, 228; Porto Rico, 232.
Cinchona, India, 324; Java, 324; S. America, 271, 324; world's production of cinchona bark (Fig. 218), 324.
Cincinnati, 27, 144, 146, 148, 151, 158, 159, 160, 164, 165, 169.
Cinnamon, 88; Ceylon and India, 330; Philippines, 226.
Cities, beginning of, 5; see also names of cities.
Citrons, Corsica, 392; Italy, 372.
Ciudad Bolívar, 278.
Civet, 353.
Civilization, defined, **38, 49;** based on the soil, **15;** first step upward, 39; Fluvial or "valley" stage, 5; Mediterranean stage, 5; Oceanic stage, 5.
Clams, 111, 198.
Clam-shell scoop, taking a 12-ton bite (Fig. 101), 163.
Clay, 123; products in Ohio, 165.
Clearing houses, **47.**
Cleveland, 160, 164, 166, 167.
Climate, **29;** how commerce depends on, **29–38;** how forests affect, **23;**

mountains affect, **21**; relation of, to man, **38**; climatic belts, **32, 33**; weather map (Fig. 21*a*), 36; vertical zones of, in tropical America (Fig. 176), 256; for climate of different countries, see under the country.
Clinton, 157.
Clothing, ready-made, **118**, 160.
Clover, 93; Egypt, 346.
Cloves, 88.
Clyde River, 403, 404.
Coal, 95, **96, 97**, 128, **448**; annual consumption, per capita (Fig. 283), 449; in Alabama, 143, 148; Alaska, 212; Allegheny-Cumberland Plateau, 143, 145, 147; Anatolia, 341; Appalachians, 160; Australia, 296; Austria and Hungary, 203, 378; Belgium, 414, 449; Brazil, 275; Bulgaria, 367; Canada, 97, **248**, 249; China, 97, 315, 316; Chosen, 308; Colorado, 187; Czechoslovakia, 383; England, 208, 447; France, 203, 378, 393, 394, 422, 449; Germany, 203, 378, 421–424, 449; Great Britain, 203, 304, 400–4, 402, 447, 449; Iberian Peninsula, 378; India, 330; Indo-China, 326; Italy, 373; Japan, 304, 307, 449; Luxembourg, 428; Malaysia, 325; Mexico, 258, 259; New Mexico, 187; New Zealand, 296; Ozark region, 143; Panama, 239; Pennsylvania, 258; Philippines, 226; Poland, 383, 433; Rocky Mountain region, 186, 187; Russia, 401, 433, 449; Scotland, 401; Serbia, 367; Siberia, 433; S. Africa, 356; S. America, **283**; Switzerland, 387; Transcaucasia, 433; U. S., 97, 116, **119, 120**, 143, 160, 203, 204, 207, 208, 449, map (Fig. 70), 120; Wales, 402, 403; Washington, 187; Yezo, 304; estimated reserve of world (Fig. 51), 97; coal and iron fields in Alabama, map (Fig. 92), 145; in Central Europe, map (Fig. 268), 422; locations, most valuable, 447; necessary to manufactories, 119; where best grades are found, 21.
Coal distillation, industrial products of (Fig. 50), 97; **coal tar**, 55, 96, 209.
Coaling and naval stations, 216, 220, 221, 222, 239, 263, 266, 287, 307, 349, 380.
Coastal Plain, 98, **99, 100**.
Coast Range [U. S.], 101, 171, 177, 193, 210.
Cobalt, New Caledonia, 293; Ontario, 248.
Cocaine, S. America, 271.
Cochabamba, 269.
Cochineal insect, 358.
Cocoa (or cacao), 33, **89, 442, 443**; in Africa, 272, 354; Antilles, Lesser, 264; Brazil, 271–273, 288, 443; Caracas, 273; Central America, 256; Ceylon, 329; Ecuador, 272, 273, 443; Guam, 222; Gulf of Guinea Islands, 359; Haiti, 265, 272; Hawaii, 218; Philippines, 226; Samoa, 293; San Thomé, 272; Santo Domingo, 272; Trinidad, 264, 272; Venezuela, 272; West Indies, 266, 272; the largest consumer, 443; **cocoa pods** in Ecuador, gathering (Fig. 187), 274.
Coconuts, 85; in Central America, 256; Ceylon, 329; Cuba, 236; Fiji, 293; Florida, 142; India, 329; Indian Ocean, Islands of, 359; Jamaica, 264; New Guinea, 293; Panama, 239; Philippines, 225, 227; Porto Rico, 232; S. America, 275; **coconut palm**, the uses of (Fig. 42), 86.
Cod fish, 79; Alaska, 211; Canada, 245; Great Britain, 399; Lofoten Bank, 408; U. S., 111, 112, 198.
Cod-liver oil, 111.
Coffee, 34, 35, **442, 443**; in Africa, 272, 354, 355; Abyssinia, 89, 353; Arabia, 336, 337; Asia, 272; Brazil, 201, 258, 272, **273, 274**, 277, 279, 287, 288, 443; Central America, 257, 258, 272, 443; Ceylon, 330; Colombia, 272; Cuba, 236; Gulf of Guinea Islands, 359; Haiti, 264, 265; Hawaii, 218, 219; India, 330; Jamaica, 264; Java, 324; Liberia, 354; Mexico, 257, 258, 272; New Caledonia, 293; Panama, 239; Philippines, 225; Porto Rico, 230, **231, 232**, 233, 443; Venezuela, 272, 277; West Indies, 266, 272; U. S., the largest consumer, 443; first coffee market in the world, 415; picking coffee near São Paulo (Fig. 186), 273; coffee tree with berries, branch of (Fig. 161), 231.
Cohoes, 115, 118, 129.
Coins, value of principal foreign, xiii.
Coir, 329.
Coke, 55, 96, 120, 121, 209.
Cola nuts, 354.
Colgate, 190.
Collars, 118, 402.
Collingwood, 250.
Cologne, 427.
Colombia, 269, 272, 275, 278.
Colombo, 331.
Colon, 239.
Colonies, of Australasia, **298, 299**, xiv, xv; Germany, **429**; the Low Countries, **416, 417**; see also **Possessions** under countries.
Colorado River, 101, **179**; Grand Cañon, 18; relief map of lower (Fig. 112), 180.
Columbia [S. C.], 145.
Columbia, Gap, 170; **River**, 101, 177, 181, 190, 191, 193, 194, 195.
Columbus, 164.
Colza seed, 369.
Commerce, growth and factors of, **1–97**; beginnings of, **1–6**; despised by Romans, **9**; character of mediæval, **9**; character of modern, **14**; Mediterranean Age of, **7–14**; Oceanic Age of, 13, 14; factors in natural control of, **15**; depends on land and sea, **15–28**; affected by high plains, **18**, lowlands, **18**, coast lines, **24**, location, **26**; depends on climate, **29–38**; relation of wind to, **31, 32**; in the Temperate zone, 38; motive power behind, 39; depends on man, **39–48**; influence of custom and morality, **41**; languages of, **42**; government aids, **43**; bearing of education on, **47, 48**; depends on economic forces, **49–58**; development of transportation, **59–77**; principal raw materials of, **78–97**; foundations of, **196**; basis of, 440; world industries and, **440–455**; organization of, **451, 452**; transportation as a factor in international, **452–454**; based on economic development, **455**; based on climate, **455**; development of world commerce (Fig. 25), 59; commerce of principal countries of the world,

xiv–xix; see also under names of countries.
Commercial, sites, typical military, naval, and, **28;** highways, map (Fig. 14), between 28, 29; museums, 306, 384, 416; policies, effect of, **44;** schools, 306, 373, 384, 416, 418.
Competition and war, economic, 57–58
Concepcion, 280, 281.
Condiments, 88, 89.
Congo River, 34, 354, 397.
Conneaut, 164.
Connellsville, 120, 121, 164, 209.
Conquest, right of, **344.**
Conservation of natural resources, 207–209.
Constantinople, 10, 11, 13, 343, 363, **368,** 369, 384, 396, 407, 426, 430, 438, 453.
Constantsa (Kustenji), 369, 370.
Cook Islands, 298.
Coolies, in treadmill pumping water for flooding rice fields (Fig. 211), 313; with loads and resting ticks (Fig. 213), 316.
Coöperative buying and selling associations, Germany, 420.
Copals, 354, 417.
Copenhagen, 411, 412, 426.
Copiapo, 283.
Copper, 21, 91, **93,** 95, 122, 448; Africa, S., 356, 357; Alaska, 212; Andes, 283; Argentina, 283; Arizona, 185; Australia, 296; Canada, 203, 247; Chile, 296; China, 315; Chosen, 308; Cuba, 237; Cyprus, 7; France, 393; Germany, 12, 421; Iberian Peninsula, 203, 378; Japan, 203, 304, 307; Mexico, 203, 258; Michigan, 161, 163; Montana, 91, 185; Newfoundland, **253;** Philippines, 226; Peru, 275; S. America, 203; Sweden, 409; Tennessee, 142; Turkey, 341; Urals, 433; U. S., 2, 203, 204; Superior copper and iron district, map (Fig. 99), 161.
Copper Valley, 212, 214, 216.
Copra, Ceylon, 329; Guam, 222; Malay Peninsula, 325; Oceania, 292; Philippines, 225, 227; Samoa 221, see also **Coconuts.**
Coral, 79, 373; limestone, 130.
Cordilleran Highland, 98, **100, 101,** 195.
Cordoba, 282, 379.
Cordova, 214, 216.
Corfu, 366.
Corinth, 8, 27.
Corinthian Canal, 74, 365; vessel traversing the (Fig. 243), 366.
Corinto, 261.
Cork, 199; oak, 351, 371, 377.
Corn, 54, **87, 88,** 159, 172, 181, 433; in America, 87; Argentina, 282; Australia, 296; British S. Africa, 282; Canada, 246; Central America, 257; Egypt, 346; France, 392; Greece, 365; Hungary, 87, 382; Italy, 371; Philippines, 225, 227; Porto Rico, 231; Rumania, 369; S. America, 87, 273, 282; U. S., 87, 135, 140, 154–156, 200, 282; its influence in occupation of America by white race, 105; exports including corn meal (Fig. 190), 282; Kafir, 179; world crop (Fig. 43), 87; plant, industrial uses of (Fig. 45), 89.
Cornstarch, 114.
Coronel, 283, 284.
Corral, 284.
Corsica, 376, 392, 397.
Costa Rica, 255, 260.
Cotton, 35, 36, 54, 59, 89, **136, 137, 443;** 444; production, value of (Fig. 46), 90, in Africa, 354, 355; Australia, 296; Brazil, 136, 274, 288; Ceylon, 330; China, 90, 313, 314, 321; Chosen, 308; Egypt; 90, 136, 346; Greece, 365; Haiti, 265; India, 90, 136, 307, 330, 332; Iranian Plateau, 333, 334; Malaysia, 325; Mexico, 136, 257, 259; Peru, 136, 274; Porto Rico, 231; Russia, 136, 433; St. Christopher, 264; Sudân, 352; Turkey, 340; U. S., 55, 90, 130, 131, **136, 137,** 140, 200, 202; Virginia, 105; picking, by hand and by machinery (Fig. 86), 138; map showing distribution of (Fig. 85), 137; destination of U. S. crop (Fig. 91), 144; industrial uses of the cotton plant (Fig. 47), 91; manufactures, **444, 445** (Fig. 279), 444; Austria, Hungary, 387, 444; Belgium, 444; Brazil, 276, 444; China, 320, 444; Czechoslovakia, 383; France, 387, 394, 444; Germany, 387, 423, 444, 445; Great Britain, 387, 402, 444, 445; Greece, 365; India, 331, 332, 387, 444; Italy, 373, 375, 387, 444; Japan, 306, 387, 444; Netherlands, 387, 444; Peru, 276; Portugal, 378; Russia, 387, 434, 438, 444; Spain, 387; Sweden, 409; Switzerland, 387–389, 444; U. S., 59, 117, 118, 144, 145, 337, 387, 444, 450; exports of cotton goods per spindle (Fig. 251), 387; cotton and cotton-seed oil (Fig. 84), 136; cotton-seed oil, 55, 136, 144.
Council Bluffs, 164.
Courtrai, 413.
Covington, 144.
Crabs, 111.
Cracow, 383.
Cremona, 372.
Creosote, 133.
Crete, 340, 362.
Crimea, 432.
Cripple Creek, 185.
Crops, value of all [U. S.], map (Fig. 133), 199, 200.
Ctesiphon, 6, 342.
Cuba, 89, 122, 148; cities, **238;** climate, 235; commerce, **237, 238,** (Fig. 166), 237; exports, 144, 201, 237, 238; forests, **235;** imports, 237, 238; manufactures, 237; map (Fig. 164), 235; minerals, 237; population, 229, 235, **237,** 262; postal rates, 61; products, 144, 201, **235–237;** railroads, 237, 238; relation to U. S., **234,** 238; surface, **235.**
Cuffs, 118, 402.
Culebra, 234, 266.
Cumberland Gap, 20, 107, 146.
Curaçao, 267; Harbor (Fig. 179), 267.
Currants, 365, 366.
Currents, distribution of ocean (Fig. 21*b*), 37.
Custom and morality, influence of, **41.**
Cutch, 329.
Cuxhaven, 427.
Cuyabá, 285.
Cuyahoga River, 106.
Cuyuna iron range, 163.

Cuzco, 269.
Cypress, 132, 302.
Cyprus, 7, 340.
Cyrenaica, 349.
Czechoslovakia, 367, 381, 383.

Dagupan, 227.
Dairen (Dalny), 320, 436.
Dairy products, 79, 80; Argentina, 281; Denmark, 80, 81; France, 391; Holland, 80; Iberian Peninsula, 377; Kansas, 156; Minnesota, 156; Nebraska, 156; Netherlands, 416; New York, 113, 114; Russia, 430; Switzerland, 80, 389; U. S., 80, **156,** 174, 199; Wisconsin, 156; and substitutes (Fig. 38), 80; see also **Butter, Cheese, Oleomargarine.**
Dallas, 143.
Dalles, the, 190, 191.
Damascus, 6, 337, 341, 342, 343; swords, 305.
Danbury, 118.
Dannemora mines, 409.
Danube River, 367, 368, **369,** 370, 375, 381, 384, 385, 389, 395, 422, 425, 426; States, commerce of the, **369, 370.**
Danville, 135.
Dardanelles, 28.
Dar es Salaam, 354.
Darwin, 297, 298.
Dates, 35, 85; Africa, 352; Arabia, 337; Arizona, 183; California, 183; Ceylon, 329; Egypt, 346; India, 329; Mesopotamia, 340; Sahara, 352; Tunisia, 351; orchard near Tempe, Arizona (Fig. 118), 185; date palms, Biskra, Algeria (Fig. 21), 36.
Davenport, 157, 164.
Dayton, 164.
Decatur, 159.
Deccan River, 331.
Decreasing returns, law of, **55–57.**
Deep Harbor, 234.
Delagoa Bay, 357.
Delaware, Bay, 109, 128; **River,** 99, 122, 125, 127; **and Raritan Canal,** 127.
Denmark, 407; commerce, facilities for, **411, 412;** exports, 80, 411 (Fig. 262), 411; map (Fig. 258), 408; possessions, 242, **266, 412;** resources, 81, **411,** 420.
Denver, 27, 148, 189, **192.**
Deodar, 329.
Depot Harbor, 250.
Derbent Pass, 435.
Derby, 402, 403.
Des Moines, 159.
Detroit, 164, 165, **169.**
Diamonds, 95; Africa, 356, 358; Brazil, 275.
Dieppe, 396.
Divi-divi pods, 271.
Dnieper River, 434, 435.
Dogger Bank, 400.
Dogs, in Belgium, 413; **dog sled** in Alaska, traveling by (Fig. 148), 215.
Doldrums, 33, 34.
Dominica, 264.
Dominican Republic (Santo Domingo), 265, 272.
Donets coal field, 433, 434.
Don River, 432, 438.
Dortmund-Ems Canal, 427.
Dover, 405.
Drava River, 364.
Drawn work, Mexico, 259.
Dry farming in the West [U. S.], **179, 180;** map (Fig. 114), 181.
Dry land areas, map (Fig. 113), 181.
Dublin, 404.
Dubuque, 157, 161.
Duluth, 27, 129, 157, 164, 167, 168, **252.**
Duma, 430.
Dundee, 402.
Dunkirk, 394, 396.
Dunvegan, 246, 247.
Durango, 258.
Durban, 357.
Durham, 144.
Dusseldorf, 423.
Dutch East Indies, 324, 325, 329, 415.
Dutch Harbor, 210.
Dutch West Indies, 242, 266, 267.
Dvina, 434, 437.
Dyes, 7, **55,** 96; France, 392; Germany, 423; New Jersey, 118; Switzerland, 388.
Dye woods, 33, 235.

Eagle, 214, 216.
East Indies, exports and products, 85, **86,** 199, 272, 415; Dutch, 325, 415.
East Liverpool, 165.
East London, 357.
Easton, 122.
East River, 125.
East St. Louis, 164.
Ebony, in Haiti, 265; Porto Rico, 231.
Ebro River, 377, 379.
Economic development, nature of, **49, 50.**
Ecuador, 277, 279; exports, 272, 276.
Edmonton, 245, 250, 252.
Education, technical, **48;** Germany, 48, 418, 451; Netherlands, 416.
Eger, see **Cheb.**
Eggs, 80; Canaries, 358; Denmark, 411; Iberian Peninsula, 377; Italy, 371; Russia, 431, 439.
Egypt, 5, 6, 8, 38, 335, 361, 406, 412; commerce, 8, **349;** conquest of, by Arabs, 10; by Turks, 13; irrigation, 70, 312, 345, 348; the "shaduf" (Fig. 232), 345; natural resources, 90, **346;** renaissance of, **348.**
Eisenerz, 383.
Elba, 373.
Elbe River, 405, 425–427, 384; **-Trave Canal,** 427.
Elephants, in Ceylon and India, 328; hauling teak logs in Burma (Fig. 221), **328.**
Elevator, modern type of, at Minneapolis (Fig. 22), 45.
Elgin, 164.
Elizabeth, 126.
Elmira, 112, 115.
El Faiyum, 346.
El Paso, 143, 149.
El Triunfo, 261.
Embargo Act, 110.
Emden, 427.
Emeralds, Colombia, 275.
Emery, in Greece, 365; Turkey, 341.
Empire of the Rising Sun, 300, 301.
Engadine Valley, 389.
England, 24, 31, 250, 407, 426, 429; agriculture, 56; export of coal, 208; see also **Great Britain.**
English Harbor, Fanning Island (Fig. 10), 25.

Ennsbrenner, 385.
Environment, adaptation to, **104, 105;** influence of, 105, 106.
Erie, 106, 122; **Barge Canal,** 107, **108,** 113, 118, **127,** 128, 129, 167; **Lake,** 106, 107, 118, 121, 127, 164, 166, 167, 169.
Erivañ, 435.
Ermine, Siberia, 431.
Erzgebirge, 383, 421.
Esdraelon, 340, 342.
Esquimalt, 251.
Essen, 423.
Esthonia, 431, 437.
Eubœa, 365.
Eucalyptus, in Australia ,294.
Euphrates, 5, 6, 338.
Eureka, 193.
Europe, 8, 9, 30, 250; climate and surface, **360, 361;** fur, 198; map (Fig. 239), between 360, 361; north central, 11; peoples, **362, 363;** population, density of, map (Fig. 240), facing 361; rainfall, 29, 37, 360, 361, map (Fig. 241), 361; why civilized, 24, **361, 362.**
European predominance in S. American markets, 284, **288–290.**
Evansville, 159.
Everett, 195.
Exchange, machinery of, **46, 47**
Exports, see under countries.

Fairbanks, 212, 215, 216.
Fairs, origin of, **1, 2;** mediæval, **10,** Germany, **427;** Russia, **438;** "World's," 10.
Falkland Islands, 31, 281, 287.
Fall Line, 116, 123, 125, 130, 131, 144, 146.
Fall River, 117.
False Bay, 358.
Fanning Islands, 25, 221; English Harbor (Fig. 10), 25.
Fans, 316.
Farming, 53; extensive and intensive, 51, 54; North Atlantic section, **113–114;** in the West, **179, 180;** by steam on Pacific slope (Fig. 115), 182; eastern Canada, **245, 246;** western Canada, **246–247;** in Germany, 420; three-field system, 431; see also **Agriculture.**
Farm products [U. S.], value of (Fig. 134), 200.
Fashoda, see **Kodok.**
Fayum, see **El Faiyum.**
Feathers, 78, 200, 259.
Federal Reserve Banks, 47.
Felting, 83.
Fernandina, 133, 147.
Fertilizers, 92, 93, 284, 420.
Fiber crops, 90; production and value of leading textile (Fig. 46), 90.
Figs, 36, 85; Algeria, 351; Egypt, 346; Greece, **365;** Italy, 372; Japan, 303; Smyrna, 340; **U. S.,** 183.
Fiji, 291, 293.
Films, moving-picture, 190.
Finland, 411, 431, 433, 437, 439.
Fir, Douglas, 84; Canada, 245; U. S., 175, 198.
Firearms, Belgium, 414; U. S., 119.
Fireworks, China, 316.
Fish, 12, **78, 79;** Alaska, 198; China, 320; France, 392; Japan, 301, 302; Norway, 410; U. S., 78, 133, **151, 197, 198.**
Fisheries, of the Adriatic, 382; Alaska, **210, 211;** Australasia, 294; British Isles, **399, 400;** Canada, 244, 245; China, 312; France, 393; Germany, 421; Hawaii, 217; Japan, **301, 302;** Iberian Peninsula, 378; Italy, 373; Marmara Sea, 368; Netherlands, 413; Newfoundland, 253; Norway, 408; Philippines, **224, 225;** U. S., 110, **111, 112, 132, 133, 175, 177, 207.**
Fishguard, 405.
Fishing, banks in Atlantic, American, map (Fig. 65), 112; bank, principal European, map (Fig. 256), 400; industry of U. S. (Fig. 131), 198.
Fishing tribes, their development into seafaring and commercial peoples, **2.**
Fitchburg, 117.
Fiume, 385.
Flax, production and value of, 90; Austria, Hungary, 383; Bohemia, 382; Belgium, 414; Egypt, 90; France, 392, 394; Great Britain, 402; Germany, 420, 424; Ireland, 399; Italy, 372; Lys Valley, 413; Rumania, 369; Russia, 382, fiber crop of world (Fig. 272), 432, 438; Switzerland, 90; U. S., 155; seed crop of world (Fig. 97), 154; flaxseed in Argentina, 154, 282; Canada, 154; France, 154; Russia, 154; U. S., 154, 155, 160.
Florence, 193, 374.
Flores, 291.
Florida East Coast Railway bridge (Fig. 94), 148.
Flour, Brazil, 276; Hungary, 383; Great Britain, 402; Manchuria, 439; Rumania, 369; Russia, 433; U. S., 114, 144, 150, 160, 189.
Flowers, France, 392; Holland, 413.
Flume, for conveying timber out of mountains (Fig. 107), 174.
Flushing, 415.
Flying machine, see **Aëroplane.**
Folkestone, 405.
Foochow, 318.
Food and Drugs Act, 45.
Forbes's Trail, 107.
Forest reserves, in Hawaii, 217; Porto Rico, 231; U. S., areas originally wooded and national reserves (Fig. 60), facing 108.
Forestry, economic importance of, **23, 24;** per cent of area forested in chief timber-producing countries (Fig. 9), 24; effects of forests, 15; relation to man, **21, 22;** how they affect soil, water power, and navigation, **22;** how they affect climate, 23; reforestation, 207; natural seeding from long-leaf pine (Fig. 143), 208.
Forests and forest products, 84, 85; in Africa, 346; Alaska, **211, 212;** Australasia, **294;** Austria, Hungary, 24, 381; Canada, **24, 245;** Central America, 256; China, **312;** Chosen, 308; Finland, 24; France, 390; Germany, 24, 419; Italy, 371; Japan, 24, **302;** Panama, 239; Philippines, **224, 225;** Russia, 24, **431;** S. America, **271, 281;** Sweden, 24, 408; Switzerland, 386; Turkey, 339; U. S., 24, **112, 132, 133, 151, 153, 174, 175** (Fig. 132), 198, **199.**
Formosa, see **Taiwan.**
Fort de France, 266.
Forth River, 404.

Fort Worth, 143, 144.
Fox, in Alaska, 210; Canada, 245; Chosen, 308.
Fox River, 106, 166.
France, 367, 385, **390–397;** Alsace-Lorraine, 393; canals, 394, 395; climate and surface, **390;** commerce (Fig. 255), 396, **397;** Customs Union of, 429; exports, 391, 392, 396, 449, 450; fisheries, 393; forest and animal products, **390, 391;** imports, 396; manufactures, 331, 393, 394; map (Fig. 253), 391; minerals, 163, 203, 393, 448; occupations, 451; population, 201, 363, **390,** 450; products of the soil, **392;** possessions, 266, 293, 332, 349–353, 359, 380, **397;** rail and inland water transportation, xix; railway mileage (Fig. 289), 452; trade routes and centers, **394–396;** tonnage merchant marine (Fig. 261), 410; sea-going (Fig. 292), 454; water power, 393; water ways, 394–396.
Frankfurt, 10, 419, 424, 426.
Frankincense, 8.
Fray Bentos, 284.
Frazer River, 101.
Freemantle, 298.
Freiberg, 421.
French Broad River, 146.
Fruit, 51, **85, 86;** Africa, 356; Australia, 296; California, 15, 181, 183 (Fig. 117), 184; Florida, 142; France, 392; Germany, 421; Great Britain, 399; Iberian Peninsula, 377; Iranian Peninsula, 333; Italy, 375; New Zealand, 296; Philippines, 225; Porto Rico, 232; S. America, 282; Tahiti, 293; Tasmania, 296; Turkey, 340, 368; U. S., 114, 140, 155, 174, 200.
Fumigation, with poisonous gas to kill insects in fruit trees (Fig. 117), 184.
Funchal, 359.
Furniture mfg., Austria, 383; France, 394; Germany, 424; Scandinavian Peninsula, 409; U. S., 144, 158.
Furs, 8, 83, **78;** importance of, in Middle Ages, 11; principal market for, 427; in Alaska, 210, 214; Canada, 78, **245;** Russia, 431; Siberia, 78; U. S. **151,** 198.
Fusan, 309.
Fustic, 256.

Gadez (Cadiz), 7.
Gaillard (Culebra) **Cut,** Frontispiece.
Galápagos Islands, 242, 279.
Galatz, 370.
Galicia (Poland), 383.
Gallipoli Peninsula, 368.
Galveston, 25, **148,** 149.
Gambia River, 354.
Gambier, East Indies, 199; Malaysia, 325.
Ganges River, 18, 328, 331.
Garonne River, 395.
Gary, 164.
Gas, 55, 95; Anatolia, 341; Illinois, 160; Indiana, 160, 165; Kansas, 160, 161, 203; Ohio, 160, 203; Ontario, 248; Pennsylvania, 123, 203; U. S., 120, 143, 203, 204, 207; W. Virginia, 203; fields in U. S. (Fig. 71), 121.
Gasoline, 96, 373.
Gate cities, 100, 129, 146, 169.
Gelatine, 158.
Gellivara iron district, 409, 411.
Genessee Road, Great, 107.
Genessee Valley, 52, 113.
Geneva, 374, 388, 389; **Lake of,** 386, 389.
Genoa, 11, 373, **374,** 375, 389, 395, 426.
Georgetown, 278.
Georgia, 434, in Transcaucasia, 434.
Georgian Bay, 245, 250, 251.
German Empire, 418.
Germany, 54, 56; agriculture, scientific, **420;** commerce, 288, 289, 425, **427, 428** (Fig. 271), 428; education, 48, **418;** exports, 409, 421, 428, 449, 450; farm products, **420, 421;** fisheries, **421;** forest and animal products, **419, 420;** imports, 421, 428; manufactures, 89, 331, **422, 423, 424,** 449; minerals, 203, 330, **421, 422;** population, 201, 363, 381, 418, 450, 451; position, **424, 425;** possessions, 222, 292, 321, 322, **429;** postal rates, 61; rank among nations due to scientific training, 451; seaports and fairs, **426, 427;** transportation, **425, 426,** 452, xviii; tonnage merchant marine (Fig. 261), 410; sea-going tonnage (Fig. 292), 454.
Ghent, 74, 413, 414, **415.**
Gibraltar, 380, 405; Strait of, 28, 351.
Gijon, 379.
Gila Valley, 193.
Ginger, Ceylon and India, 330; Jamaica, 264.
Ginseng, 308.
Glacial soils, in U. S. (Fig. 63), 110.
Glacier, effects of the, 109, 110.
Glasgow, 398, 403, 405.
Glass, 7, 8, 92; Belgium, 414; Czechoslovakia, 383; France, 394; Great Britain, 403; Indiana, 165; Pennsylvania, **123;** Russia, 434; Spain, 378.
Glens Falls, 115.
Gloucester, 112.
Gloversville, 117.
Gloves, Austria, 383; Denmark, 411; France, 391; N. Y., 117.
Glucose, 88.
Glue, 158.
Goa, 332.
Goats, 79, **80;** Angora and Cashmere, 83; Africa, 351, 356; Asia, 315; Austria, Hungary, 381; France, 391; Greece, 364; Hawaii, 217; Iberian Peninsula, 377; Iranian Peninsula, 332; Italy, 371; Montenegro, 367; Porto Rico, 232; Russia, 432; Turkey, 368; U. S., 174.
Gobelin tapestries, 394.
Goderich, 250.
Gogebic, 163.
Gold, 9, 21, 95, 448; Africa, 8, 91, 203, 353, 354, 356, 357, 358; Alaska, 212, 214, 215; Argentina, 283; Asia, 203; Australia, 203, 296, 299; California, 15, **183,** 185, 194, 258, 296; Canada, 247; China, 315; Chosen, 308; Colorado, 185; Dakota, S., 161; Georgia, 142; Greece, 365; Guiana, 275; India, 330; Madagascar, 359; Mexico, 258, 261; New Guinea, 293; New Zealand, 296; Nicaragua, 258; N. Carolina, 142; Panama, 239; Philippines, 226; Russia, 203, 433; Siberia, 433; S. America, 283; U. S., 161, 203, 204; **dredge,** modern, at work (Fig. 120), 187.
Gold Coast, 354.
Goldfield, 65.
Good Hope, Cape, 28, 31, 298, 346; Fort, 247.
Göta Canal, 410.

Göteborg, 409, 410.
Government, inspection, 45; service of, **43, 44;** peoples, **430.**
Grain harvesting, evolution of (Fig. 95), 152.
Grains, map showing yield of all (Fig. 96), 153.
Grand Canal, 317, 318, 319.
Grand Cañon of the Arkansas (Fig. 6), 19.
Grand Rapids, 158.
Granite, 20, 118, 119, 142.
Grapefruit, 142.
Grapes, 36, 85; Algeria, 351; Australia, 295; Bulgaria, 367; Germany, 421; Greece, 365; Iberian Peninsula, 378; Rumania, 369; Russia, 432; U. S., 183.
Graphite, value of (Fig. 224), 330; in Austria, 330; Czechoslovakia, 383; Ceylon, 330; Germany, 422; Siberia, 433; U. S., 330.
Graz, 383.
Grazing industry, 81, (Fig. 106), 173; decline of the, 172, 174.
Great Basin, 101.
Great Britain and Ireland, 24, 31, **398–406;** climate and surface, **398;** commerce, 262, **405** (Fig. 257), 406; exports, 405, 406, 449, 450; **fisheries, 399, 400;** imports, 401, 405, 406; map (Fig. 238); manufactures, 331, **401;** textile industry, **401, 402,** 449; grain and sugar industry, **402;** causes of prominence in manufactures, 450, 451; mineral resources, 163, 203, **400–403;** population, 201, **398,** 450, 451; postal rates, 61; products of the soil, **398, 399;** possessions, **405–406;** in Africa, 352, 353, 355, 359; Egypt, 348; Asia, 324, 337, 340; China, 322; India, 327; Islands of Indian Ocean, 359; Mediterranean Sea, **380;** West Indies, **263;** railway mileage, 452; rail and inland water transportation, xviii; seaports, **404;** situation and transportation facilities, **403, 404,** xviii; sea-going tonnage (Fig. 292), 454; tonnage of merchant marine (Fig. 261), 410.
Great Falls, 190.
Great Plains, 100, 130, 132, 170, 179.
Great Valley, 99.
Great Yarmouth, 400.
Greece, 8, 24, 38, 361–366, 368, 370, 374, 376; products, **364;** commerce, **366.**
Greeks, 6, **7, 8,** 9, 363, 364.
Green Bay, 157.
Greenland, 412.
Greenwich, 46.
Grenada, 264.
Grenoble, 391.
Grimsby, 400.
Grindstones, 165.
Guadalajara, 259, 260.
Guadalquivir River, 377, 379.
Guadeloupe, 266.
Guam, 222, 291, 293; map (Fig. 154), 222.
Guanacos, 270.
Guanajuato, 258.
Guano, Africa, 356; Oceania, 292, 293; S. America, 275; W. Indies, 264; Act, 298; Islands, 221.
Guanta, 278.
Guantánamo, 234.
Guatemala, 255, **256,** 260, 261.
Guayaquil, 277, 279.
Guaymas, 260.
Guiana, 270, **275, 278;** mountains, 268.
Guinea, Gulf of, 344, 358; Islands, 359.
Gulf Coast, 132; region, commercial routes and centers of, **147–149.**
Gum, 133; arabic, 346, 351, 352; Kauri, 294; -lac, 329; tragacanth, 339.
Gutta-percha, 84, 85; in Malaysia, 325; Philippines, 224; S. America, 273; tree, freshly tapped, (Fig. 41), 84.
Gypsum, 123; Alaska, 213; France, 393; U. S., 165, 187.

Haddock, 111, 198, 245.
Hadramut Valley, 336.
Haidar Pasha, 343.
Haifa, 340, 342.
Haiti, 232, 262, 264, **265.**
Hakodate, 307.
Halfa, 348, 349.
Halibut, 211, 399.
Halifax, 125, 244, 251.
Haiphong, 327.
Halle, 423.
Hamburg, 75, 384, 404, 411, 418, 426, **427,** 431; rank as seaport, 453; -American steamship line, 266.
Hamilton, 164, 249.
Hammocks, 259.
Hammond, 159.
Hams, 411.
Handicrafts, Ceylon and India, 331; Japan, **304, 305,** 307; Switzerland, 388; hand weaving in Ireland, 402.
Hankow, 316, 318, 319.
Hanoi, 327.
Hanover, 421, **422.**
Hanse, 11, 12, 418, 427.
Harbin, 314, 320, 439.
Harbors, formation of, **24–26.**
Harpers Ferry, 20.
Harrisburg, 122.
Hartford, 118, 119.
Harvesters, which cut, thresh, and sack, in one operation (Fig. 115), 182.
Harwich, 405.
Harz Mountains, 12, 421.
Hats, 118; plaited straw, Cuba, 237; Chosen, 308; Panama, Ecuador, 276.
Hauran Plateau, 340.
Havana, 149, 234–238.
Haverhill, 117, 160.
Havre, 28, 394, 395, 396.
Hawaii, 194, **216–220,** 221, 292, 293; commerce, **219, 220** (Fig. 151), 219; exports, 219, 260; imports, 219, 220; map (Fig. 149), 217; population, 216, **219** (Fig. 151), 219; natural resources, **217, 218,** 219.
Hay, Australia, 299; Canada, 247; U. S., 114, 181, 200; map (Fig. 66), 113.
Heat and light, causes affecting, **30, 31.**
Helsingfors, 437.
Hemlock, 112, 116, 153, 160, 198, 249.
Hemp, 90, 148; production and value (Fig. 46), 90; Belgium, 414; China, 313; France, 392, 394; Hungary, 382; Italy 372; Japan, 303, 306; Kentucky, 135; Philippines, 225, 226; shipping Manila hemp in original bundles (Fig. 157), 226; Russia, 382, fiber crop of world (Fig. 273), 432, 434, 438; brake, 136.
Herat, 334, 343.

Hermoupolis, 366.
Herring, Alaska, 211; Canada, 245; Great Britain, 399; Norway, 408; U. S., 111, 198; pursing a seine about a school of herring in Boston Harbor (Fig. 37), 79.
Herzegovina, (Serb-Croat-Slovene State), 385.
Heyst (Zeebrugge), 415.
Hickory, 133.
Hides, 12, 200; Africa, 358; Arabia, 337; China, 321; India, 329, 332; Malay Peninsula, 325; S. America, 287; Turkey, 339: U. S., 18; value of U. S. import, 200.
Highways, to the West, early, map (Fig. 59), 107; to the Pacific, map (Fig. 124), 191; **Commercial** (Fig. 14), bet. 28, 29.
Himálayas, 311, 328, 360.
Hobart, 297, 298.
Hoboken, 126; **West Hoboken,** 118.
Hodeida, 336.
Hogs, see **Swine.**
Holbrook, 188.
Holland, 70, dairying in, 80; exports, 413; imports, 416; natural resources, **413;** tonnage of merchant marine (Fig. 261), 410; trade routes and centers, **415;** see also **Netherlands.**
Holyhead, 405.
Holyoke, 112.
Homestead, 122.
Honda, 278.
Honduras, 254, 256, 258.
Honey, 80, 90; Cuba, 236; France, 391; Greece, 80, 364.
Hong Kong, 27, 241, 321, **322,** 326, 406; rank as seaport, 453; **Harbor** (Fig. 217), 322.
Honolulu, 216, **220;** map (Fig. 152), 220.
Hops, 87; Bavarian Plateau, 421; Bohemia, 382; Germany, 421; Oregon, 181; U.S., 114; irrigated hop yard on Pacific slope (Fig. 116), 183.
Horse latitudes, 32, 35, 36.
Horses, 79; Asia, 315; Australia, 295; Belgium, 413; France, **391;** Germany, 420; Hawaii, 217; Hungary, 381; Iberian Peninsula, 377; Kentucky, 134; Queensland, 295; Russia, 432; U. S., 134, 172, 199.
Hosiery, 402, 424.
Houston, 144.
Hudson Bay, 100, 250; **Company,** 245.
Hudson River, 99, 100, 106, 108, 115, 116, 122, 123, 126, 127, 129, 249.
Hull, 405.
Humber, The, 404, 405.
Humboldt Bay, 193.
Hungary, 364; see also **Austria and Hungary.**
Hunters and fishers, trade among, 2.
Huron, Lake, 167, 169, 250, 251.
Hwang Ho, 311, **312,** 316, 322.
Hydraulic elevator, on Glacier Creek, Alaska (Fig. 145), 212.
Hymettos, Mount, 80, 364.

Iberian Peninsula, 376–380; climate and surface, 376, 377; inhabitants, 376; map (Fig. 246), 376; trade routes and centers, **378, 379.**
Iceland, 400, **412.**
Ichang, 319.
Idaho, 185.
Idria, 383.
Illinois and Michigan Canal, 167.
Illinois River, 106, 166, 167, 169.
Iloilo, 228.
Imperial Valley, 179, 193.
India, 250, 295, 298, **327–332,** 361, 375, 426, 436; animal products, **328, 329;** climate and surface, **328;** commerce, **331, 332** (Fig. 226), 332; cultivated products, 90, 139, 307, 312, **329, 330;** exports, 331, 332; forests, **320;** government, 327, 406; imports, 332; manufactures, **331;** minerals, **330;** population, 35, 56, 450; sea routes to, 6, 13.
India ink, 315.
Indianapolis, 27, 159.
Indian Ocean, 337; islands of, **359.**
Indigo, Bengal, 324; India, 329; Java, 324; Salvador, 256; Sudân, 352; U. S., 105.
Indo-China, 326, 327, 397; commerce and products, 312, **326, 327;** French, **225,** 326.
Indus River, 331, 332.
Industrial Education, 48; Germany, 48, 418, 451; Netherlands, 416.
Industries, complementary, **53, 54;** localization of, **50;** see also specific industries.
Industry, and commerce, factors in natural control of, **15;** and poverty, **53,** 136, 219, 262, 306, 316, **441,** 443, **445, 446,** 447; primitive woman in, 64.
International Commission, 369.
International Date Line, 46.
International Postal Union, 61.
Iodine, 284.
Iquique, 287.
Iquitos, 277.
Iranian Plateau, 332–334, 338; exports, 332, 333; products, **332–334;** trade routes, **334.**
Ireland, 363, 405; home rule, 406; postal rates, 61; products, 399, 401, 402; railways, 404; surface, 398.
Iron, 93, 94, 96, 448; ore, modern method of handling (Figs. 100, 101), 162, 163; Africa, 351, 356; Alabama (Fig. 92), 145, 148: Australia, 296, 297; Austria, 383; Belgium, 414; Blue Ridge [U. S.], 142; Canada, 247, 249; China, 315; Chosen, 308; Colorado, 185; Cuba, 237; Finland, 433; France, 163, 393, 447; Germany, 421, 423, 447; Great Britain, 163, 400, 447; Greece, 365; Iberian Peninsula, 378; Italy, 373; Japan, 304; Luxembourg, 429; Mexico, 258; Newfoundland, 253; New York, 122; Philippines, 226; Russia, 433, 447; S. America, 275, 283, 284; Spain, 447; Superior ranges, Lake, 121, 161, 163, map (Fig. 99), 161; Sweden, 12, 410, 411, 447; Switzerland, 387; Tasmania, 296; U. S., 116, 119, 121, **163,** 185, 204, 207, 208, 447; and coal fields of central Europe, map (Fig. 268), 422; manufactures, Austria, 383, 449; Belgium, 449; Canada, 44, 249; China, 316; Germany, **423,** 449; Great Britain, 401, 402, 403, 449; France, 394, 449; Japan, 305; Russia, 434, 449; Spain, 378; Sweden, 409, 449; U. S., **120–122,** 144, 145, **164,** 189, 206, 448, 449; industry of the world (Fig. 282), 447.
Iron Gate, 369.
Iroquois trail, 107.
Irrawaddy River, 331, 332.

Irrigation, [illegible] Africa, 245, 248, [illegible] Canada, 207; Egypt, 245, 248; India, [illegible] 177, 179; China, Turkestan, China, Fig. 199, [illegible] frame, and [illegible] pipe irrigating [illegible] 74, 109; [illegible] (Fig. 116), 183; irrigated lands in the West, map (Fig. 108), 175; irrigating a field, California (Fig. 119), 177.
Isar River, [illegible]
Isfahan, [illegible]
Isinglass, [illegible]
Ironmasters Guild, [illegible]
Isser, [illegible]
Isle de Pelon, [illegible]
Isle of Man, 405.
Italy, 9, 12, 13, **371–376**, 381, 389; cities, rise of, 11; commerce, **375** (Fig. 245); crop products, **371–373**; exports, 199, 312, 375, 450; forest and animal products, **371**; imports, 375; manufactures, 373; [illegible] map (Fig. 244), [illegible] resources, 203, **373**, 382; population, 363, 371, 381, 459; possession, 353, **376**; [illegible] 124; shipping tonnage 454; transportation routes and trade centers, **374**, 375, 385.
Ivory, 33, **78**; Africa, 8, 351, 353, 417; Ceylon, 331; India, 331; fossil, in Prussia, 431; [illegible] America, [illegible]

Jackson, [illegible]
Jacksonville, [illegible]
Jade, [illegible]
Jaffa, 349.
Jamaica, 263, 264
James River, 96
Jamestown, 115.
Japan, 58, 222, 241, 250, **300–308**; climate and surface, 302; agricultural products, **302**, **303**, 312; commerce, **307**, **308**, and crops (Fig. 207), 307; exports, 303, 305, 307, 459; fisheries, **301**, **302**; forests, 24, **302**; handicrafts, **304**, **305**; human portrait in, 64; imports, 305; [illegible] mandate over, 222, 292; manufactures, **305**, **306**; map (Fig. 199), 300; mineral resources, 301, 304; population, 301, [illegible] 451; progress, 301; shipping tonnage, 454; shipping to [illegible] of, [illegible] 305; [illegible] 305; transportation and trade routes of, **306**, **307**; **Sea of**, 307.
Jarvis Island, [illegible]
Java, 324, 325, 337.
Jeffersonville, 149.
Jemappes, [illegible]
Jerabina, [illegible]
Jersey City, 118, 126.
Jewelry, 119, 259, 394, 4[illegible]
Jibuti, 353.
Jidda, 337.
Jinrikishas, 306.
Jobos, [illegible]
Johannesburg, [illegible] market place at (Fig. 256), [illegible]
Johnstown, [illegible] 117 (Fig. 122).
Joliet, 164.
Joplin, 161.
Jordan River, 338, 340, [illegible]
Jutay, 265
Juneau, 212, 213, 214.
Juniata River, 107, 128.
Jura Mountains, 386, 388, 389.
Jute, 35; production and value, 90; manufacture (Fig. 225), 331; in Belgium, 414; France, 331, 394; Germany, 331; Great Britain, 331, 402; India, 90, 329, 331, 332; U. S., 331.

Kâbul, 334, 343.
Kalamata, [illegible] 366.
Kalamazoo, [illegible]
Kalgan, 318, 319.
Kamchatka, 399.
Kandahar, 334.
Kankakee River, 106.
Kano, 353.
Kansas City [Kan.], 159; [Mo.], 27, 159, 169.
Kaolin, 424.
Karachi, 332.
Karlovy Vary [Carlsbad], 383.
Kashgar, 323.
Katanga, [illegible]
Kayes, [illegible] 354
Kazaß, 434
Keel, [illegible] of, 12.
Kelang, [illegible]
Kerman, [illegible]
Kerosene, 96, [illegible]
Keshikan, 214.
Key West, 28, 133, 144, **Florida East Coast Railway bridge at** (Fig. 94), 148, **149**, [illegible]
Khaibar Pass, [illegible]
Kharput, [illegible]
Khartoum, [illegible]
Khiva, [illegible]
Kiang, [illegible]
Kiakhta, 323.
Kiaochow, 323, 429; **Bay**, 322.
Kidderminster, 402.
Kiel, 412, 423, 427; **Ship Canal**, 74, 405.
Kiev, 432.
Kimberley, [illegible]
Kingston, [illegible] **Harbor**, 264.
Kishinev, [illegible]
Kishon River, [illegible]
Kittanning Path, [illegible]
Klondike, the, 247.
Knoxville, 142, 144, 146, 147.
Kobe, 306, 307.
Kodok, 348.
Königshütte, 421.
Kopias, Lake, 365.
Korea, see **Chosen**.
Korean oxen and sleds (Fig. 208), 309.
Kosel River, [illegible]
Kotlas, [illegible]
Krefeld, [illegible]
Krivoi Rog, 434.
Krupp steel works, 423; bird's-eye view of (Fig. 269), 423.
Kurdish rugs, [illegible]
Kurais, [illegible]
Kyoto, [illegible]

Labor, beginning of division of, 2; geographic division of, 39, 49, **50**, 55, 57, 59, 79, **440**; maximum returns from, 53; scarcity of, 219; skilled, 119.
Labrador, 253; current, 109, 110, 253.
Lace, Belgium, 414; France, 394; Great Britain, 402; Mexico, 259.

Lacquered and enameled goods in Japan, 305.
Lacquer tree, 302.
La Crosse, 157.
La Dorado, 278.
La Guaira, 278.
Laings Nek, 357.
Lakes, Great, 106, 108, 109, 110, 114, 129, 151, 155, 157, **165, 167.**
Lambskins, 332.
Lancaster, 115.
Land routes, the crossing of, **27.**
Language, influence of, 42.
Languages of commerce, 42 (Fig. 229), facing 344.
Laos, 326.
La Paz, 260, 269, 276, 277, 285.
La Plata River, 268, 277, 284, 286.
Lard, 158.
Larissa, 365.
La Rochelle (La Pallice), 396.
Las Palmas, 359.
Latakia, 340.
Latin, nations, 363; **tongue,** 364.
Latvia, 431, 437.
Launceston, 297, 298.
La Union, 261.
Laurentian Highland, 249, 268.
Laurion, 365.
Lawrence, 117.
Lead, 95; Africa, 356; Australia, 203, 296; Austria, 383; Belgium, 414; British Columbia, 248; China, 315; France, 393; Germany, 203, 421; Great Britain, 403; Greece, 365; Iowa, 161; Idaho, 185; Italy, 373; Japan, 304; Mexico, 203, 258; Missouri, 161; Spain, 7, 203, 378; Sweden, 409; U. S., 203, 204; Virginia, 142; Wales, 400.
Leadville, 185.
Leather, and animal fibers, **81, 83;** goods, Austria, 383; France, 394; Germany, 424; Mexico, 259; Russia, 433; Spain, 378; S. America, 284; Turkey, 368; U. S., 124, 143, 160, 190.
Lebanon Mountains, 335, 337, 340, 342.
Le Creusot, 393, 394, 414.
Leeds, 402.
Leghorn, 374.
Lehigh Valley, 123.
Leipsig, 10, 424, 427.
Lemons, 36; Cuba, 237; Italy, 372; Jaffa, 340; U. S., 183.
Leon, 259.
Lerdo, 257.
Lethbridge, 248.
Leukos Limen (Kosseir), 8.
Levant, the, 10, 370.
"Leviathan," the (Fig. 36), 76.
Lewiston [Idaho], 191; [Me.], 117.
Lexington, 131, 134.
Liau Ho, 320.
Liautung, 319.
Liberec, 383.
Liberia, 353.
Libya, 349–350, 376.
Licorice, 339, 371.
Liechtenstein, 362, 385, 429.
Liège, 414, 415.
Life zones in N. A., map (Fig. 78), 131.
Light, causes affecting, **30, 31.**
Lille, 394.
Lily bulbs, in the Bermudas, 263.
Lima, 277, 279.
Lima beans, 181.
Limes, 264.
Limestone, 122, 145, 249, 356, **447.**
Limoges, 394.
Limon, 260.
Linares, 378.
Linen manufacture, Austria and Hungary, 383; Belgium, 414; Czechoslovakia, 383; Egypt, 8; France, 394; Germany, 423, 424; Great Britain and Ireland, 402; Russia, 434.
Lingah, 334.
Lingua Franca, 42.
Linseed, 329; **oil,** 155.
Lisbon, 12, 378, 379, 396.
Litani (Leontes) **Valley,** 342.
Lithographic stone, 422.
Little Rock, 143.
Liverpool, 241, 250, 402, 404; rank as seaport, 453.
Live stock, 133, 134, 199, 200, 202; in 1907 (Fig. 39), 81; see also **Stock industry.**
Llamas, 65, 270, 277; in Peru, waiting for their load (Fig. 188), 276.
Llanos, 34, 268, 270.
Lobito Bay, 357.
Lobsters, 79, 111, 198, 245, 378.
Locomotives, 122; fifteen years' development in (Fig. 31), 69.
Lodz, 434.
Loetschberg Tunnel, 389.
Logrono, 379.
Logwood, 256, 264.
Loire River, 394.
Lombok, 291.
London [Can.], 248; [Eng.], 27, 38, 47, **80,** 198, 241, 250, 295, 357, 375, **404,** 405, 415, 426, 437; rank as seaport, 453.
Londonderry, 402.
Long Island, 126; **Sound,** 112.
Lorain, 164.
Los Angeles, 171, 189, **193.**
Louisville, 27, 144, 146, 149, 169.
Lourenço Marques, 357.
Low Countries, 412–417; colonies, **416–417;** commerce, **415, 416;** manufactures, **414;** natural resources, **413, 414;** trade routes and centers, **414, 415.**
Lowell, 117.
Lowlands, affect transportation and commerce, how, **18;** principal source of world's food supply, 17.
Lübeck, 12, 418, 426, **427.**
Ludwig Canal, 426.
Ludwigshafen, 424.
Lumber and lumber mfg.: Austria, Hungary, 383; Canada, 199; Norway, 410; Rumania, 369; Russia, 433; Sweden, 410; U. S., 112, 133, 143, 153, **157,** 190 (Fig. 132), 198, 206.
Luxembourg, 362, **429.**
Lvov, 383.
Lynn, 116, 117, 160; **Canal,** 214.
Lyon, 374, 394, 423.
Lys River, 413, 414.

Macadam, 67.
Macao Island, 321.
Macaroni, 373.
"Macchie," 371.
Machinery, American, in Turkey-in-Asia, 340; export of (Fig. 285), 449.

Mackenzie River, 248, 249.
Mackerel, 79, 111, 198, 245, 399.
Mackintosh's invention, 84.
Madagascar, 359, 397.
Madeira Islands, 358, 359, 378; River, 278.
Madras, 331.
Madrid, 379, 396.
Magdalena River, 278; Bay, 242.
Magdeburg, 420.
Magellan, Strait of, 241, 281, 287.
Magnesite, 365.
Maguey, 226.
Mahogany, 33, 84, 235, 256.
Mail, pieces of, handled yearly per capita (Fig. 290), 453; pneumatic tubes used for transporting, 72; rates for carrying, 77.
Maize, see **Corn.**
Malacca, Strait of, 28.
Malaga, 377–379.
Malaysia, 296, **324–326;** agricultural products, **324, 325;** commerce, **325, 326;** exports, 325, 326; imports, 326.
Malta, 380, 405.
Manahiki Islands, 221, 298.
Manaos, 279.
Manchester [Eng.], 74, 402, 404, 405; Ship Canal, 404; [N. H.], 117.
Manchuria, 309, 312, 314, 315, 317–320, 323, 439.
Mandalay, 331.
Mangabeira, 272.
Manganese, 93; Brazil, 275, 330; Cuba, 149, 237, 330; Germany, 330; Greece, 365; India, 330; Japan, 304; Russia, 433; Transcaucasia, 433; world's production of (Fig. 223), 330.
Mango, Ceylon, 329; East Indies, 85; Florida, 142; India, 329; Philippines, 225.
Mangrove bark, 354.
Maniçoba rubber, 272.
Manila, 35, 90, 222, 223, 225, 227, **228,** 241, 307; map (Fig. 159), 228.
Manioc, Africa, 86; S. America, 86, 273.
Mannheim, 424, 425.
Mansfield, 421.
Manufactures, relation of mountains to mining and, **20, 21;** exports of (Fig. 286), 450; rank of nations in, **448–451;** in Australasia, **296, 297;** Austria, Hungary, **383;** Belgium, 414; Canada, **248, 249;** China, **315, 316;** Cuba, 237; France, **393,** 449; Germany, **422,** 449; Great Britain and Ireland, **401,** 405, 449; Ibernian Peninsula, 378; Italy, **373;** Japan, **305, 306;** low countries, **414;** Mexico and Central America, **259;** Porto Rico, 237; Russia, **433, 434;** Switzerland, **388;** S. America, **276, 284;** U. S., 111, **115, 116, 117, 118,** 126, **143–145, 156, 157, 158, 160, 164, 188–190, 204, 205** (Fig. 142), 206; exports, 449; location of, **156;** mechanical power in (Fig. 67), 115; water power, 115; value (Fig. 140), 205; westward migration of centers (Fig. 98), 157.
Manzanillo, 254, 260.
Maple, 151, 198.
Maracaibo, 278.
Marble, 20; Alaska, 213; Italy, 373; Georgia, 142; Greece, 365; Vermont, 119.
Margarine, 411, 416.
Mariannes, 222, 292.
Maritsa-Morava Pass, 368.
Maritsa Valley, 367–369.
Markets, origin of, **1;** connection between, and religious sanctuaries, 1, 2; foreign, for manufactures necessary, **205, 206;** where they may be found, **206, 207.**
Marlborough [Mass.], 117.
Marquette, 163.
Marseille, 8, 374, 389, 394, 395, 396, 426; part of water front in port of (Fig. 254), 395.
Marshall Islands, 292.
Marten fur, Canada, 245; Russia, 431.
Martinique, 236, 266.
Maskat, see **Muscat.**
Massawa, 353, 376.
Mastic, 339.
Matanuska, 213.
Matches, Japan, 305; Sweden, 305, 409.
Maté, 282.
Matting, China, 316; Japan, 305.
Mauritius, 359.
Mayaguez, 231.
Maximum returns, from capital, **52, 53;** labor, **53;** land, **51, 52;** the principle of, **40, 51.**
Mazatlan, 260.
Meaford, 250.
Meat, 59; products, **81;** U. S. export, 200; packing, 114, **158, 159,** 189; by-products, 158.
Mecca, 2, 337, 342.
Medina, 337.
Mediterranean Age of Commerce, 7–14.
Mediterranean, American, 234.
Mediterranean Peninsulas, Other, 371–380.
Mediterranean region, climate of, 360, 364.
Mediterranean Sea, 5–10, 12, 13, 36, 335, 360, 379, 426.
Mediterranean stage of civilization, 5.
Meissen, 424.
Mekong River, 327.
Melbourne, 296, 297, **298.**
Memel River, 434.
Memphis, [Tenn.], 27, 133, 144, **149,** 280; [Egypt], 349.
Menádo, 222, 293.
Menam River, 327.
Mendoza, 282, 283.
Menhaden, 111.
Menominee, 163.
Mentasta Pass, 216.
Merchant Marine, tonnage of, showing relative importance of ocean shipping (Fig. 261), 410.
Mercury, Austria, 203, 383; Iberian Peninsula, 378; Italy, 203; Mexico, 203; Spain, 203, 378; U. S., 143, 185, 203, 204; Yugoslavia, 383.
Meriden, 119.
Merino, 83.
Mersey River, 404.
Merv, 436.
Merwede Canal, 415.
Mesabi, 163.
Mescal, 257.
Meshed, 333.
Mesopotamia, 5, **6,** 8, 92, 335, **338,** 340, 361; commercial centers, 342; desolation of, 6, 340; map (Fig. 228), 338; meeting place of East and West, 6; products, 340, 341; road building first begun in, 67.

Messengers, communication by, **59, 60.**
Messina, 375.
Mesta River, 367.
Metallic products of the West [U. S.], **183, 185, 186.**
Metals, industries, 7, 11, 305; precious, 95.
Metric system of weights and measures, xiii.
Meuse River, 404, 412.
Mexico, climate, **254, 255;** commerce, **261, 262;** (Fig. 178), 261; exports, 90, 261, 262; handiwork, 259; imports, 261, 262; map (Fig. 182), facing 269; manufactures, **259;** minerals, 203, 258; physical features, **254, 255;** population (Fig. 178), 261; postal rates, 61; products, 256–258, 272, 273; profile view of (Fig. 175), 255; transportation, 66, 240, 261; **City of,** 255; **Gulf of,** 100, 108.
Miami, 142; **River,** 106.
Mica, Canada, 248; Ceylon and India, 330; U. S., 142.
Michigan, Lake, 158, 164.
Michipicoten, 163.
Middle America, see **Central America.**
Middlesbrough, 400, 402.
Midland, 250.
Midland Canal System, 425, 426.
Midway Island, 222.
Milan, 27, 373, 374, 395, 396.
Military highways, 9; naval and commercial sites, typical, **28.**
Milk, 114; condensed, 387, 409; see also **Dairy products.**
Millet, in Africa, 87; China and Manchuria, 314; Egypt, 346; India, 87; Sudân, 352.
Milo, 179.
Milwaukee, 160, 164, 168.
Minerals, 447, 448; influence of, **90, 91;** world's production of (Fig. 138), 203; in Africa, 351; Alaska, 211, **212, 213,** 447; Austria, 383; Belgium, 414; Bulgaria, 367; Canada, **247, 248** (Fig. 173), 247; Chinese Republic, 315, 447; France, 393; Germany, **421, 422, 448;** Great Britain, **400, 401, 402, 403, 448;** Greece, 365; Iberian Peninsula, 378; Japan, **304,** 307; Philippines, **225;** Russia, 433; Serbia, 369; Spain, 379; S. America, **275, 283;** Turkey, 341; U. S., **118, 119, 122, 123, 142, 165, 186–188,** 199, **202–204,** 448; location of metallic deposits in the West, map (Fig. 119), 186; value per square mile, map (Fig. 137), 202; mineral industry of U. S. (Fig. 139), 204; mineral fertilizers, **92, 93;** fuels, **95, 119, 120, 160.**
Minneapolis, 157, 159, 169, 247, 252.
Mississippi River, 100, 108, 130, 149, 151, 164, 165, 166, 169, 170, 179, 268, 312; an artery of commerce, **147;** system, canals of, **166.**
Missouri River, 73, 108, 165, 166, 169, 172.
Mobile, 28, 143, 148.
Mohair, Africa, 358; Turkey, 339.
Mohammera, 334.
Mohawk Gap, 108, 129; **River,** 100, 106, 118, 124.
Molasses, 88, 90.
Moldau River, 384.
Mole, St. Nicolas, 265.
Moline, 157, 158.
Mollendo, 277.
Mombasa, 354.
Monaco, 362, 397.
Monastir, 367.
Monazite, 275.
Moncton, 250, 251.
Money, 46, 47; gold standard, **47.**
Mongolia, 311, 314, 317, 319, 323.
Mons, 414.
Mont Cenis Tunnel, 389, 395.
Montenegro, 367.
Monterrey, 259.
Montevideo, 286.
Montgomery, 143.
Montreal, 27, 125, 169, 249, 250, **251, 279.**
Montserrat, 264.
Morava River, 384; valley, 369.
Moravia (Czechoslovakia), 383.
Moresnet, 414.
Morocco, 349, 350, 351.
Mortar, 123.
Moscow, 434, 435.
Moselle River, 423.
Mosul, 342, 343.
Mound Builders, 142.
Mountains, affect agriculture and transportation, 20; climate, **21;** profile sketch showing relation of, to rainfall in Utah (Fig. 7), 21; relation of, to mining and manufactures, 20.
Moving-picture films, 190.
Mulberry, Japan, 302, 307; Russia, 433.
Mules, Iberian Peninsula, 377; S. America, 277; U. S., 134, 172, 199.
München-Gladbach, 423.
Muncie, 165.
Munich, 374, **424,** 426.
Murex, 7.
Murray River, 297.
Muscat, 337.
Mushrooms, 392.
Musk, 315.
Muskegon, 157.
Muskingum River, 106, 167.
Mustard, 88.
Mutton, 416.
Myrobalans, 329.
Myrrh, 8, 336.
Mysore, 330.

Nagasaki, 305, **307.**
Nagoya, 305.
Nanaimo, 248.
Nancy, 394.
Nanking, 315, 318.
Nankou Pass, 319.
Nantes, 393, 396.
Naples, 372, 374, **375.**
Narbonne, 391.
Narva, 434.
Narvik, 411.
Nashua, 119.
Nashville, 131, **144.**
Nassau, 263.
Natal, 356.
Nationality, influence of, 42, 43.
National Road, 107, 108.
Nature, what man owes to, **15.**
Naval sites, 28; see also **Coaling and naval stations.**
Navigation, how forests affect, **22;** inland, **72, 73;** and railways, 73; ocean, **74, 75.**
Naxos, 365.
Negros, 225, 226.
Nejd, 336, 352.

Nemacolins Path, 107.
Nepál, 327.
Netherlands, 26, 44, **412,** 413; canals, 415; colonies, **416, 417;** commerce, **415, 416,** (Fig. 264), 416; exports, 416; fishing, 413; imports, 416; map (Fig. 263), 412; manufactures, **414;** population, 450, 451; occupations of people, 451; railway mileage, 452; trade routes and centers, **414, 415.**
Neva River, 434, 435.
New Almaden, 185.
Newark, 116, 118, 126.
New Bedford, 117, 175.
New Britain, 119.
New Brunswick, 243, 245.
New Caledonia, 292, **293.**
Newcastle [N. S. W.], 296, 297, 298; [Pa.], 122.
Newcastle-on-Tyne, 403.
Newchwang (Niuchwang), 314, 320.
Newfoundland, 61, **253,** 405.
New Guinea, 291, 292, **293,** 298.
New Haven [Conn.], 119; **Newhaven,** [Eng.], 405.
New London, 119.
New Orleans, 27, 131, 133, 143, 146, **148,** 149, 166, 194, 260, 280; Harbor (Fig. 93), 147.
Newport, 144.
Newport News, 133, 146.
New York, Bay, 126; **City,** 27, 117, 118, 119, 123, 124, 125, **126, 127,** 128, 129, 146, 171, 241, 250, 251, 260, 263, 264, 277, 289, 404; rank as seaport, 453; **Harbor,** 126; map (Fig. 76), 126; subways and tunnels (Fig. 77), 127; State Barge Canal, 128.
New Zealand, 80, 250, 291, 293, 297, 405; colonies, 220, 298; commercial centers, 298; products, 295, 296.
Niagara, 122; **Falls,** long distance transmission of electric power from (Fig. 68), 116; water power at (Fig. 69), 117; **River,** 115.
Nicaragua, 254, 256, 258, 269.
Nice, 390, 392.
Nickel, 247, 293.
Nigeria, 353.
Niger River, 352, 354.
Nijni Novgorod, 10.
Nikolaiev, 437.
Nile River, 5, 8, 18, **346,** 349, 352, 354, 412.
Nineveh, 6, 342.
Ninghai, 320.
Nish, 369.
Nishapur, 333.
Nisibin, 343.
Nitrate industry, 54, 92, 283, **284,** 287.
Nitrogen, 92, 93.
Nome, 212, 214, 215, 216.
Norfolk, 140, 146.
Norristown, 118.
Norrköping, 409.
North America, 36, **98–102;** climate, **101, 102;** coast line and surface, **98;** life zones in, map (Fig. 78), 131; map (Fig. 53); rainfall, **102;** position, 98.
North Sea, 360, 363, 384, 415, 421, 427; **Canal,** 415.
North Sea Nations, Lesser, **407–417.**
Norway, 25, 87, **407;** exports, 410; fishing industry, 408; map (Fig. 258), 408; sea-going tonnage (Fig. 292), 454; tonnage of merchant marine (Fig. 261), 410; wood and wood-pulp exports, 409; see also **Scandinavian Peninsula.**
Nottingham, 402.
Nova Scotia, 245, 247, 248, 252.
Numea, 293.
Nürnberg, 13, **424.**
Nushki, 334.
Nutmegs, 88; Ceylon and India, 330; Grenada, 264; Philippines, 226.
Nutria, fur of, 83.
Nuts, 85, **86,** 183, 333, 354.

Oak, Greece, 364; Japan, 302; Philippines, 223; Rumania, 381; Turkey, 339; U. S., 116, 133, 151, 198.
Oakland, 190.
Oats, 87, **88;** Australia, 299; Canada, 247; France, 87, 392; Germany, 87, 420; Great Britain, 87, 399; Hungary, 382; New Zealand, 296; Russia, 87, 431; Scandinavian Peninsula, 409; Tasmania, 296; U. S., 87, 113, 140, 154; world crop (Fig. 43), 87.
Ob′, 431, 435; **-Yenisei Canal,** 435.
Obok, 353.
Occupations of people (Fig. 288), 451.
Ocean, commerce, paths of, **28;** currents, distribution of, map (Fig. 21*b*), 37; "greyhounds," 75; subdued to man's use, 76; routes, termini of, **26, 27;** world, **291.**
Oceania and Australasia, 291–299; commerce, **292, 293;** islands of coral and volcanic formation, 291; map (Fig. 195), between 290, 291; partition of, **292.**
Oceanic age of commerce, 13, 14.
Oceanic stage of civilization, 5.
Oder River, 423, 425, 426, 427.
Odessa, 426, 437.
Office, interior of a general (Fig. 5), 14.
Ohio River, 17, 106, 108, 118, 121, 125, 126, 129, 130, 149, **165, 166, 167;** falls of the, 107, 149; fleet of barges carrying coal down the (Fig. 102), 166.
Oil, Africa, 356; California, 187; Indiana, 160; Mesopotamia, 341; Mexico, 258, 259; Ohio, 160; Rumania, 369; Baku, 439; Trinidad, 264; U. S. (Fig. 71) 121; transporting, cost of, 72; wells and derricks in Bakersville district (Fig. 121), 188; **Seeds,** Africa, 354; Belgium, 413; France, 392, 394; India, 329, 332.
Oil City, 120.
Olean, 120.
Oleomargarine, 55, 80, 158; Denmark, 80; Germany, 80; Great Britain, 80; Netherlands, 80; Scandinavian Peninsula, 409; U. S., 80.
Olive oil, 55; France, 396; Greece, 364; Italy, 372, 375.
Olives, 36, 85; Australia, 295; France, 392; Greece, 364; Haifa, 340; Iberian Peninsula, 377; Russia, 433; Tunisia, 351; U. S., 183.
Olympia [Greece], 2; [Wash.], 195.
Omaha, 169.
Oman, 336.
Oneida Carrying Place, 106.
Onions, 87, 114, 263, 377.
Ontario, Lake, 115, 127, 249, 251.
Onyx, 258.

Opals, 258.
Open-hearth, steel, 145.
Opium, Asia, 89; Ceylon, 330; China, 320, 322; India, 330, 332; Iranian Plateau, 333; Smyrna, 340; Turkey, 340, 368; poppies, 313.
Oporto, 379.
Oran, 351.
Orange, 118.
Orange Free State, 357.
Oranges, 36, 85; Australia, 295; China, 313; Cuba, 237; Florida, 142; Greece, 365; Iberian Peninsula, 378; Italy, 372; Jaffa, 340; Jamaica, 264; Japan, 303; Paraguay, 282; Porto Rico, 232; U. S., 183.
Orchilla (litmus), 358
Oregon City, 190.
Orenburg, 436.
Orinoco River, 264, 270, 277, 278.
Orontes, 6, 8, 339, 342.
Oroya, 277.
Oruro, 275.
Osaka, 306.
Oshkosh, 157.
Ostend, 415.
Ostrich farming, 174, 356; feathers, 351, 352, 358.
Oswego, 114, 115; **Canal,** 127; **River,** 106.
Ottawa River, 245, 249, 251.
Overland trails, the first, **106, 107.**
Owen Sound, 250.
Ox teams, Australia (Fig. 197), 295.
Oysters, 79, 112, 114, 133, 198, 393.
Ozarks, 100, 130, 140.
Ozokerite, 187.

Pacific ports, comparative distances from Hamburg and New York to, before and after opening of Panama Canal (Fig. 169), 241.
Pack animals, 65.
Pago Pago, 221; **Harbor** (Fig. 11), 25; (Fig. 24), 58.
Paita, 293.
Palermo, 375.
Palestine, 339.
Palmerston Island, 29
Palmetto roots, 144.
Palm oil, 354.
Palmyra, 6.
Panama, 234, 254, 298, 299; **Republic of, 239, 240;** postal rates, 61; relation of, to U. S., **238, 239; Bay of,** 239; **Canal,** 28, 73, 74, 149, 167, 194, 220, 221, **240–242,** 260, 264, 267, 285, 292, 437; effect of (Fig. 169), 241, 290; excavated to grade at Matachin (Fig. 168), 240; plans for safety of, 242; **Canal Zone,** 9, see **Panama Canal; Harbor of,** at low tide (Fig. 170), 242; hats, 232, 276.
Panama Canal, 220, map (Fig. 167), 238; effect of (Fig. 169), 241, 267.
Pan-American Railway, 277, 285, 290, 357.
Paper manufacturing, Canada, 249; China, 316; France, 394; Germany, 424; Greece, 365; Japan, 305; Netherlands, 414; Spain, 378; Scandinavian Peninsula, 409; U. S., 112, 113, 157, 206.
Pará (Belem), 279; chestnuts, 271; rubber, 272.
Paraffin, 96.
Paraguay, 281, 282, 285–287; **River,** 285.
Paris, 318, 370, 375, 379, 389, 390, 395 396, 426, 437; manufactures, 394.
Parmesan cheese, 80, 371.
Paros, 365.
Pasig River, 228.
Passaic, 118; **River,** 118.
Passau, 422.
Pasto, 269.
Paterson, 118.
Patras, 365.
Pauillac, 396.
Pawtucket, 117.
Payta, 275, 277.
Peabody, 116.
Peace River Valley, 246.
Peace Treaty, 292.
Peaches, 86, 140, 183.
Peanut butter, 142.
Peanuts, 140.
Pearl Harbor, 220; map (Fig. 152), 220.
"Pearl of the Antilles," 235.
Pearls, 8, 79; Australia, 294; Bahrein Islands, 337; California, Gulf of, 258; Ceylon, 328; Malaysia, 325; Nicoya Bay, 258; Oceania, 292; Panama, Bay of, 239; Persian Gulf, 333; S. America, 275; Sulu Sea, 224.
Pears, 86, 247, 392.
Peat, 16, 401, 409.
Pecans, 85, 142.
Pei Ho, 317.
Peking, 11, 317, 318, 319, 437.
Peloponnesus (Morea), 365.
Pemba, 354.
Pennine Range, 401, 402.
Penobscot River, 112.
Pensacola, 148.
Peons, 41.
Peoria, 158, **160.**
Pepper, 88, 89; America, 88; Ceylon and India, 330; Philippines, 226; Siam, 326; Sumatra, 324.
Peppermint, 155.
Perche, 379.
Perfumes, 392.
Pernambuco, 272, 274, 279.
Persia, 6, 8, 38, 331–335, 343.
Persian Fire Worshipers, 95.
Persian Gulf, 334, 335, 343, 427.
Persian traders, with pack camels (Fig. 227), 333.
Persimmons, 303.
Perth, 297, 298.
Perthus, 379.
Peru, 86, 241, **272,** 274–277, 283, 290.
Petersburg, 144.
Petrograd (St. Petersburg), 396, 411, 426, 431, 434, 435, 437.
Petroleum, 55, **95,** 143; Apennines, 373; Poland, 383; Burma, 330; California, 187; Illinois, 160; Indiana, 160; Japan, 304; Kansas, 160; Malaysia, 325; Mexico, 258; Ohio, 160; Ontario, 248; Panama, 240; Rumania, 369; Russia, 95, 203, 433, 435; S. America, 275, 283; U. S., 95, 120, 203, 204, 207; oil and gas fields of U. S., 121; industrial products of, (Fig. 49), **96.**
Pforzheim, 424, 426.
Philadelphia, 27, 116, **118–120, 122, 125,** 128, 146; bird's-eye view of Reading Terminals at (Fig. 12), 26.
Philippines, 35, 194, **223–228,** 300, 324;

agricultural and mineral products, **225, 226**, 227, **228**; banks and money in, 227; commerce, **226–228** (Fig. 158), 227; exports, 227; fisheries and forests of, **224, 225**; inhabitants, **224**; map (Fig. 196), facing 291; postal service in, 227; rice terraces in (Fig. 155), 223; seaports, **228**; tariff, **228**.
Philistia, 340.
Phoenicia, 335.
Phoenicians, 2, 6, **7**, 43.
Phormium, 296.
Phosphate, 55; Africa, 351; Florida, 149; France, 393; Oceania, 292, 293; U. S., 142, 143, 204; phosphate-rock production of the world (Fig. 89), 142.
Phosphorus, 93.
Piassava, 271.
"Pidgin" English, 42.
Piedmont region, 99, 130–132.
Pig iron, annual production of, per capita (Fig. 284), 449; modern method of handling (Fig. 48), 94; totals in 1906 (Fig. 282), 447.
Pilchards, 399.
Pimento, 88.
Pine, 84; Canada, 245; Chosen, 308; Manchuria, 312; New Zealand, 294; Philippines, 223; S. America, 281; U. S., 112, 132, 133, 153, 174, 175, 198, 199.
Pineapples, Bahamas, 263; Cuba, 237; Florida, 142; Hawaii, **218**; Malaysia, 325; Porto Rico, 232; fiber (piña), 226.
Pinehurst, 142.
Pipe lines, 70, 72.
Piræus, 365.
Pitch, 84, 133.
Pittsburgh, 27, 119, 120, 121, 123, 125, 126, 129, 164, 165, 167.
Piura Valley, 274.
Plantain, 329.
Plants, cultivated, **85**; how they connect man with the earth, **83**.
Plaster of Paris, 123.
Plated ware, 119.
Platinum, 433.
Platt Amendment, 234, 238.
Plow horses in China, Human (Fig. 212), 314.
Plums, 86; Germany, 421; Japan, 303; Rumania, 369; Serbia, 367; U. S., 183.
Plymouth, 400, 405.
Plzen, 383.
Pod crops, 86, 87.
Pola, 28.
Poland, 381, 383, 431, 433, 435, 439.
Polenta, 372.
Ponape Island, 291.
Ponce, 233.
Pondicherry, 332.
Pongo de Manseriche, 277.
Pontebba, 385.
Poplar, 133 (Fig. 132), 198.
Population, U. S., density of, per square mile (Fig. 58), 104; distribution of, illustrates man's control by nature, 104; westward migration of centers of (Fig. 98), 157; growth of, in principal commercial countries (Fig. 136), 201; per square mile, of principal commercial countries (Fig. 187), 450; of the world, density of, map (Fig. 13), facing 28; of principal commercial countries of the world, xiv; see also under countries.
Porcelain, Austria, 383; China, 315; Czechoslovakia, 383; France, 394; Great Britain, 403; Japan, 305; Russia, 434; U. S., 123.
Po River, 371, 372, 374.
Portages, historic, 106, 166.
Port Arthur, [Can.], 250, 251; [China], 314, 318, 323.
Port Augusta, 298.
Port au Prince, 265.
Port Curtis, 297.
Port Darwin, 297, 298.
Port Elizabeth, 357.
Porterage, Human, 64.
Port Huron, 169.
Port Hunter, 297.
Port Jackson, 297.
Portland [Can.], 250, 251; [Me.], 124, 125, 291; [Ore.], 189, 190, 191, 193, **194, 195.**
Portland cement, 92, 165 (Fig. 73), **123.**
Port McNicoll, 250.
Port Mann, 250.
Port Nelson, 250.
Porto Alegre, 286.
Porto Rico, 229–234, 262, 263, 266, 267; climate and surface, **230, 231**; commerce, **232–234** (Fig. 162), 232; education, 230; exports, 232; manufactures, 237; map (Fig. 160), 230; military road in (Fig. 163), 233; people and government, **229, 230**; products, 231, 232.
Port of Spain, 264.
Port Phillip, 297.
Port Said, 241, 349.
Port Sudân, 349.
Portugal, 67, **376–380**; commerce, **379, 380**; crop products, **377, 378**; exports, 377, 378; forest and animal products, **377**; manufactures, **378**; other products, 203, 378; possessions, 321, 324, 332, 355, 359, 379, 380.
Post, the, **60**; transportation rates for, 77.
Postal routes, map (Fig. 52), facing 98.
Potash salts, 422.
Potassium, 93.
Potatoes, 88, 90, 218, 273; Alaska, 214; America, 86; Austria, Hungary, 88, 382; Belgium, 413; Bermudas, 263; Canada, 246, 247; Chile, 282; Denmark, 411; France, 88, 392; Germany, 88, 420; Great Britain and Ireland, 88, 399; Maine, 114; Michigan, 155; New York, 114, 155; New Zealand, 296; Norway, 87; Peru, 86; Philippines, 225; Russia, 88, 431; Scandinavian Peninsula, 409; S. America, 273; Tasmania, 296; U. S., 88, 140, 181; Wisconsin, 155; world crop (Fig. 44), 88.
Poti, 435.
Potomac River, 20, 99, 108, 127, 128, 130, 146.
Potosi, 275.
"Potteries," the, 403.
Pottery, 92; Belgium, 414; Great Britain, 403; Mexico, 259; Netherlands, 414; Ohio, 165; Russia, 434; S. America, 276; U. S., 123; **Delft,** 414.
Pottsville, 119.
Poultry, 80, Belgium, 413; California, 174; China, 314; Czechoslovakia, 381; France, 391; Germany, 420; Iberian Peninsula, 377; Italy, 371; U. S., 174, 199.

Praha (Prague), 383, 384.
Pribilof Islands, 210.
Prince Edward Island, 245.
Prince of Wales Island, 212, 213.
Prince Rupert, 250, 252.
Prince William Sound, 215.
Proctor, 119.
Providence, 118, 119.
Prunes, 86, 183, 200, 367, 392.
Prussia, 420.
Puebla, 259.
Puerto Barrios, 260.
Puerto Cabello, 278.
Puerto Mexico (Coatzacoalcos), **259**.
Puerto Montt, 281, 285.
Puerto Plata, 265.
Puget Sound, 25, 101, 175, 190, 194, 195, 252.
Pulp, wood, 157; exports (Fig. 260), 409.
Pulque, 257.
Punjab, 332.
Punta Arenas, 261, 287.
Pyramids, and an electric trolley (Fig. 233), 347.
Pyrenees, 360, 363, 368, 379, 380, 390, 395.

Quartz, 95, 212.
Quebec, 125, 245, 248, 249, 250, 251, 397.
Quebracho, 281.
Queen Charlotte Islands, 248.
Queensland, 295, 298, 405.
Quetta, 333, 334.
Quincy, 119, 164.
Quinine, 271, 414.
Quinua, 273.
Quito, 269, 277.

Rabba, 354.
Rabbits, 83; Australia, 295; Belgium, 413.
Race, influence of, **40**; races of man, map (Fig. 200), facing 300.
Racine, 158.
Raffia, 359.
Ragusa, 385.
Railroad, the, **69, 70**; first continental in America, 239, 240; transcontinental roads, 240; railways in Africa, 354, **357**; Arabia, 337; Australasia, 297; Austria, Hungary, 384; Belgium, 414; Canada, **249, 250**; Central America, 259–261; China, 317, 318; Cuba, 237, 238; Danube States, 370; France, 395; Germany, 426; Great Britain and Ireland, 404; Greece, 365; India, 331; Italy, 374; Japan, 306; Malaysia, 325; Philippines, 227; Russia, **435, 436**; S. America, **277**, 285, 286; Switzerland, 389; Sudân, 352, 353; Turkey, 342, 343, 368; U.S., **128, 129, 145, 146**, 167–169, 191, 192; density of (Fig. 127), facing 196; railway mileage per 1,000 square miles of territory, showing relative density of railways (Fig. 289), 452; railway mileage of the principal countries of the world, xiv; railway mileage in Austria, Hungary, Belgium, Canada, France, Germany, Great Britain, Russia, United States, xviii.
Rainfall, mean annual, and prevailing winds (Fig. 15), facing 29; in U. S., (Fig. 57), 103; why it rains, **29, 30**; see also **Climate** under countries.
Rainy River, 157.
Raisin grapes, picking (Fig. 111), 178.
Raisins, 85; Australia, 295; California, 183, 296; Iberian Peninsula, 378; Smyrna, 340.
Raleigh, 145.
Ramie, **313**.
Rampart, 214.
Rangoon, 330, 332.
Rattan, Malaysia, 325; Philippines, 224.
Raw materials of commerce, **78–97**.
Reading, 122.
Recife, 270.
Reclamation service, **177, 179**; first work completed by (Fig. 109), 176.
Red River Carts (Fig. 29), 66.
Red River Valley, 18, 150, 153.
Red Sea, 8, 338, 349, 352, 353.
Redwood, 175, 193, 199.
Reforestation of cut-over land in U. S. (Fig. 143), 208.
Regensburg, 425.
Reichenberg, see Liberec.
Reims, 394.
Reindeer, in Alaska, 213; freighting with (Fig. 146), 213; Russia, 431; Scandinavian Peninsula, 409.
Religion, influence of, **40**.
Religious festivals, 2.
Resin, **84**; Africa, 354; Arabia, 336, 337; Malaysia, 325; Philippines, 224.
Reunion, 359.
Revel, 431, 437.
Revolutions, destructive to industry and commerce, 255, 430.
Rhine, industrial district, 54, 423, 427; **River**, 374, 384, 385, 389, 394, 404, 412, 415, 421, 423, 424, 425, **426**, 427; **-Rhone Canal**, 426; **-Seine Canal**, 426.
Rhodes, 8.
Rhodesia, 34, 355, 356, 357.
Rhodope Range, 367.
Rhone River, 389, 392, 394, 395, 396, 426.
Rice, 35, 88, 433; exports, sources of (Fig. 220), 326; field in the Philippines, plowing with caraboo (Fig. 156), 225; market, 427; terraces, in Philippines (Fig. 155), 223; threshing in Louisiana (Fig. 87), 139; water, **88**; Asia, 87; Bulgaria, 367; Burma, 329; China, 312, **313**, 314, 320, 321; Chosen, 308, 312; Egypt, 346; Hawaii, 218; India, 312, 326, 332; Indo-China, 225, 312, 326; Iranian Plateau, 333; Italy, **371**; Japan, 301, **303**, 307, 312; Louisiana, 131, 139; Malay Peninsula, 326; Philippines, 225, 227, 228; Porto Rico, 231; Siam, 326; S. America, 273; S. Carolina, 139; Texas, 131, 139; Turkey, 341; Virginia, 105
Richmond, 144, 171.
Rideau Canal, 249.
Riga, 431, 437.
Rio de Janeiro, 273, 277, 279; **Harbor**, view of (Fig. 189), 278.
Rio Grande, 149.
Rio Grande do Sul, 270, 286.
Rioja, 283.
Rio Tinto, 378.
Rivers, navigable, 73; see also names of rivers.
Road, a mud, and same road macadamized (Fig. 30), 68; construction of roads, **67**.
Roanoke, 144.
Rochester, 114, 115, 117, 129.
Rockford, 158.

Rockhampton, 296, 297.
Rock Island, 108, 157, 166.
Rocky Mountains, 30, 100, 101, 107, 161, 170, 174, 179, 192, 210, 248, 268.
Roman, Empire, 8, 9; **Roads,** 67; **Romans,** 8, 43.
Rome, 7 28, 38, 371, 426; N. Y., 106.
Roncesvalles, 379.
Root and pod crops, 86, 87.
Roquefort cheese, 80.
Rosario, 286.
Rosewood, 84, 256.
Rosin, 84, 133, 198, 199; sources of, international commerce (Fig. 79), 132.
Rossland mines, 247.
Rostov, 437.
Rotterdam, 74, 404, **415;** rank as seaport, 453.
Roubaix, 394, 396.
Rouen, 394, 396.
Royal Gorge, Grand Cañon of the Arkansas (Fig. 6), **19.**
Rubber, 33, 84, 199, **446, 447;** Africa, 354, 447; Belgian Congo, 272, 417; Brazil, 272, 447; Central America, 256; Ceylon, 330, 447; East Indies, 272; Hawaii, 218; Madagascar, 359; Malay Peninsula, 325, 447; Mexico, 258; New Guinea, 293; Philippines, 224; S. America, **271, 272, 273,** 287, 288; industry, 84; goods, **118,** 160, 424, 434; tree, tapping a (Fig. 184), 271.
Rubies, 95, 330.
Rugs, Persia, 333, 334; Turkey, 341, 368.
Ruhr, coal field, 54, 423; **River,** 421.
Rumania, 364, **369,** 370; exports, 282, 369, 381, map (Fig. 242), 362.
Rumanians, 363, 364, 381.
Ruschuk, 370.
Russia, 58, 88, 196, 363, 407, 427, **430–439;** characteristics, **430;** climate, 31, 360, **430, 431;** commerce, **438, 439;** exports, 282, 409, 431, 433, 434, 438, 439; fairs, 438; government, **430;** imports, 438, 439; leather, 433; manufactures, **433, 434;** map (Fig. 202), facing 301; minerals, 203, 330, 433; population, 201, 363, 430, 450; possessions, 323, 334, 439; resources, other, 312, **433;** sea-going tonnage (Fig. 292), 454; seaports of, **437, 438;** sub-tropical, **432, 433;** transportation, land, **435, 436;** rail and inland water, xix; water ways, **434, 435;** tundra and forest belts, **431;** uses of soil and commerce of (Fig. 275), 438; wheat and grasslands of, 392, **432;** zone of mixed farming in, **431, 432.**
Rutland, 119.
Rye, 87, **88;** Belgium, 413; France, 392; Germany, 88, 420; Hungary, 382; Japan, 303; Russia, 88, 431; U. S., 88, 113, 154; world crop (Fig. 44), 88.

Saar Basin, 393.
Saba, 262, 267.
Sabanilla, 278.
Sabinas, 258, 259.
Sable, Canada, 245; Russia, 431.
Sacramento, 189, 191; **River,** 101.
Saddlery, 160.
Saffron, 378.
Saginaw, 157.
Sago. 86, 325.
Saguenay River, 245.
Sahara, 29, 30, 35, 344, 350, 351, 352.
Saigon, 327.
Sailing ship, modern steel, 74, 75; (Fig. 35), 75; **wheelbarrows** (Fig. 155), 223.
St. Anthony, falls of, 159.
St. Clair River, 250.
Ste. Croix, 242, 266 (Fig. 194).
St. Etienne, 394.
St. Gobain, mirrors, 394.
St. Gothard Tunnel, 389, 426.
St. Helens, 403.
St. John [W. Ind.], 242, 266; [N. B.], 125, 249, 251; **St. Johns** [Newf.], 253.
St. Joseph, 108, 159; **River,** 106.
St. Lawrence River, 99, 100, 106, 124, 125, 127, 128, 245, 246, 248–251, 268.
St. Louis, 27, 151, 158–160, 164, **169;** **River,** 106, 157, 164.
St. Michael, 214.
St. Nazaire, 396.
St. Paul, 27, 149, 151, 159, 164, 169, 252.
St. Petersburg, see **Petrograd.**
St. Thomas, 234, 242, 266 (Fig. 194), 359.
Sakhalin, 300, 304, 307.
Sal, 329.
Salem, 116, 117.
Salina Cruz, 260.
Salisbury, 357.
Salmon, 79, 151, 177, 198, 211, 214, 245, 301.
Salonika, 366, 369, 370, 385.
Salt, Austria, 383; Bahamas, 263; California, 188; Germany, 422; Iberian Peninsula, 378; Iowa, 165; Italy, 373; Kansas, 165; Louisiana, 143; Michigan, 123, 165; Mexico, 258; New York, 123; Poland, 383; Rumania, 369; Switzerland, 387, Texas, 165; Transcaucasia, 433; Utah; 178; W. Indies, 264.
Salt Lake, Great, 19, 175, 177; **City, 192,** 193.
Salto, 285.
Salton Sink, 179; salt piles in (Fig. 122), 189.
Salvador, 256, 261.
Salzburg, 374, 383.
Samara, 343, 435.
Samarkand, 436.
Samoa, 194, 216, **220, 221,** 222, 292, 293; map (Fig. 153), 221.
Samsun, 340, 343.
Sana, 336.
San Antonio, 140, 143.
San Bernardino, 193.
Sandalwood, India, 329; New Guinea, 293; Porto Rico, 231.
San Diego, 188, **193.**
Sandstone, 122, 131.
San Francisco, 27, 63, 108, 171, 174, 175, 189, 190, 193, **194,** 195, 221, 241, 252, 260, 280, 293, 298; **Bay,** 191, 194.
San Joaquin River, 101, 193.
San Juan, 230, **233.**
San Luis Potosi, 258.
San Luis Valley, 177.
San Marino, 362.
San Pedro, 26, 193; artificial harbor at (Fig. 126), 194.
Santa Marta Cesar, 275, 278.
Santiago, 235, 237, 238, 283, 287.
Santo Domingo, see **Dominican Republic.**
Santos, 273, 279, 286.
São Francisco, 275; **River,** 279.
São Roque, 28.

Sapan wood, 225.
Sapphires, 188.
Sardines, 111, 373, 378, 393.
Sardinia, 373.
Sarsaparilla, 271.
Saskatchewan River, 245, 249.
Satinwood, 265.
Sault Ste. Marie, 157, 169, 249; **Canal,** 74, 163, 167 (Fig. 103), 168.
Savannah [Ga.], 133, 147.
"Savannah," the (Fig. 36), 76.
Savanna Zone, 34.
Saverne Pass, 395, 426.
Savona, 373.
Sawakin, see Suakin.
Saxony, 422, 424.
Scandinavian Peninsula, 360, **407–411;** climate and surface, 407; commerce, **410, 411;** exports, 409–411; imports, 410; map (Fig. 258), 408; people, 363, **407;** resources, **408–410.**
Schaffhausen, 388.
Scheldt River, 412, 415.
Schenectady, 122, 129.
Schools, industrial and commercial, Austria-Hungary, 384; Germany, 418; Italy, 373; Netherlands, 416; Switzerland, 388.
Schuylkill River, 127.
Scotland, 363, 400, 401, 402, 405; see also **Great Britain.**
Scranton, 119, 122.
Sea, unity of the, **74;** harvest of, **78, 79.**
Sea-going tonnage of chief commercial nations (Fig. 292), 454.
Seals, fur, 210; skins, 79, 198.
Sea otter, 198, 210.
Seaports, rank of world's greatest (Fig. 291), 453; see also under countries.
Seattle, 171, 177, 189, 195.
Seine River, 394, 395, 396, 415.
Seleucia, 6, 342.
Semmering Tunnel, 385.
Senegal, 352, 354.
Seraing, 414.
Serb-Croat-Slovene Kingdom, 381, 385.
Serbia, 363, 364, **367,** 369, 381, 385.
Sesame, 315, 329.
Severn River, 404.
Seville, 377, 378, 379.
Sèvres china, 394.
Seward Peninsula, 214, 215, 216.
Shad, 111, 198.
"Shaduf," method of irrigation used in Egypt (Fig. 232), 345.
Shanghai, 228, 293, 316, 318, 319, 437; native part of water front at (Fig. 215), 319.
Shantung, Peninsula, 317, 319, 320, 322, 323; **Mountains,** 315.
Shark fins, 292.
Sharon, 340.
Sheboygan, 158.
Sheep, 79 (Fig. 39), 81, 83; Africa 81, 351, 356; Alaska, 213; Arabia, 336; Ardennes Plateau, 314; Argentina, 281; Asia, 315; Australia, 81; Belgium, 413; Bohemian Plateau, 381; Central America, 256; Chile, 281; Falkland Islands, 281; France, 391, 394; Germany, 420; Great Britain, 81, 401, 402; Greece, 364; Hawaii, 217; Iberian Peninsula, 377; Iranian Plateau, 332; Italy, 371; Michigan, 155; Montenegro, 367; Netherlands, 413; New South Wales, 295; New Zealand, 81, 295; Ohio, 155; Oklahoma, 134; Rumania, 369; Russia, 81, 432; Scandinavian Peninsula, 409; Serbia, 367; South America, 81, 270; Texas, 134; Turkey, 81, 339, 368; U. S., 81, 156, 172, 174, 199; grazing (Fig. 106), 173.
Sheffield, 403.
Shellac, 329.
Shenandoah Valley, 107.
Shepherds, camp of nomadic (Fig. 1), 3; trade among, **2, 3.**
Ship, building, 110, 119, 122, 189, 305, 403; of the desert, 3; modern (Fig. 28), 66; old and new in ocean steamships (Fig. 36), 76.
Shoe manufacturing, Brazil, 276; Canada, 249; Austria, 383; France, 394; Switzerland, 388; U. S., 59, **116, 117.**
Shrimps, 133.
Siam, 326, 327.
Siberia, 37, 78, 282, 307, 319, 431, 433, 439.
Siberian Railway, 435, **436, 437.**
Sicily, 237, 372, 373, 375.
Sidon, 6, 8, 342.
Sierras, 21, 101, 102, 170, 172, 177, 183, 185, 190, 192, 193.
Signals, use of, **61, 62;** used by U. S. Weather Bureau (Fig. 26), 61.
Si Kiang, 313, 322.
Silk, 8, 12, 35, **445, 446;** artificial, 83; in the Middle Ages, 10; manufactures, **118;** production and value (Fig. 46), 90; raw, 53, 200; used in manufactures and export of silk manufactures (Fig. 281), 446; reeling, from cocoons in Japan (Fig. 206), 305; wild, 329; in Asia, 83; Austria, 383, 446; Bulgaria, 367; China, 83, 312, 313, **314,** 320, 321, 445, 446; Czechoslovakia, 383; France, 392, 394, 446; Germany, 423, 446; Great Britain, 402, 446; Greece, 365; India, 312; Iranian Peninsula, 333; Italy, 312, 372, 373, 375, 382, 445, 446; Japan, 303, 307, 312, 445, 446; Russia, 312, 434, 446; Switzerland, 388, 389, 446; Turkey, 312, 340, 341, 368; U. S., 118, 446.
Silver, 9, 21, 95; Australia, 203, **296;** Belgium, 414; Canada, 203, **296;** Central America, 203; China, 315; Germany, 421; Greece, 365; Honduras, 258; Japan, 304; Iberian Peninsula, 378; Mexico, 203, 258, 261; north central Europe, 11, 12; Ontario, 248; S. America, 203, 283; Spain, 7; Sweden, 409; Turkey-in-Asia, 341; U. S., 153, 185, 203, 204, 275; Yugoslavia, 383; mines of Potosi and Cerro de Pasco, 275.
Simplon Tunnel, 389, 395.
Singapore, 27, 218, 228, 241, **325, 326.**
Sioux City, 159.
Sipka (Shipka) **Pass,** 367, 368.
Sisal, 148; Bahamas, 263; Hawaii, 218; Mexico, 90, 261; New Guinea, 293; Yucatan, 257, 258.
Sitka, 210, 280.
Sivas, 340.
Skagway, 214.
Skins, preservation of, 81, 83.
Slate, 20, 142.
Slavs, 363, 364, 381.
Smelting industry, 143, 188
Smyrna, 340, 341, 343.

Snake River, 191.
Soap, 158, 394.
Society Islands, 293.
Soda, 123.
Sofia, 369, 370.
Soil, civilization based on the, **15;** kinds of, **16;** organic matter in, **16;** formation and transportation of, **17;** alluvial, **17;** glacial, 17, 150, 151; map (Fig. 63), 110; loess, 17; residual, 17; how forests affect, **22;** hillside ruined by erosion, where forest had been cut away (Fig. 8), 23; of North Atlantic section, **109, 110;** Southern section, **130, 131;** of North Central section, **150, 151;** scientific agriculture in Germany, 420; use of soil in European Russia, 438; method of using, map (Fig. 231), facing 345.
Sokoto, 352.
Solingen, 423.
Solnhofen, 422.
Songkoi River, 326, 327.
Sorghum, 179.
South America, 43; as a whole, **268;** map (Fig. 181), between 268, 269; population by races (Fig. 183), 269; **temperate, 280–290;** climate, **280;** commerce, **286, 287;** commercial relations, **287–290;** crops, **282, 283;** forests, **281;** inhabitants, 283; manufactures, **284;** mineral products, 203, 283; nitrate industry, **284;** physical features, **280;** society, organization of, 283; stock raising, **281;** transportation, internal, **284, 285;** U. S. of, **286;** **tropical, 268–279;** climate, **268, 269;** crops, **273–275;** exports, 271, 272, 275; forest products, **271;** grasslands, **270;** inhabitants, **269, 270;** manufactures, **276;** mineral resources, 203, **275;** mountains, **269;** principal ports, **278, 279;** rubber industry, **272;** staple tropical exports (Fig. 185), 272; transportation, internal, **276–278.**
Southampton, 405.
South Bend, 106, 158.
South Bethlehem, 122.
South Chicago, 164.
South Omaha, 159.
South Willems Canal, 415.
Soy beans, 86, 303, 315.
Spain, 7, 44, 67, 171, **376–380;** commerce, 262, **379, 380;** crops and products, 86, **377, 378;** exports, 377, 378 (Fig. 247), 380; forest and animal products, **377;** manufactures, **378;** map (Fig. 246), 376; minerals, 203, 378; people, 255, 270, 363, 378; possessions, 222, 350, 359, 379, 380.
Spice Islands, 324.
Spices, 8, 12, 114, 226.
Spinning Jenny, 401.
Spokane, 170, 181, 189, 190, 193.
Sponges, 79; Africa, 351; Bahamas, 263; Florida, 133; Greek Islands, 364; Turkish Islands, 340.
Springfield [Ill.], 164; [Mass.], 119; [Ohio], 119.
Spruce, 84, 112, 153, 198, 245.
Squirrels, 83, 308.
Stanley Falls, 354.
Starch, 89, 159.
Stassfurt, 93, 420, 422.
Steamboat furthered work of unification, 108.
Steamships, ocean, 75; the old and the new (Fig. 36), 76.
Steel, 92, **93, 94;** Austria, 383; Belgium, 314; Chile, 284; France, 447; Germany, 423, 447; Krupp steel works (Fig. 269), 423; Great Britain, 447; Russia, 447; Switzerland, 389; U. S., 119, 122, **164,** 189, 206, 447; steel works at Pittsburgh (Fig. 72), 121.
Steelton [Pa.], 122.
Stettin, 423, 427.
Steyr, 383.
Stimulants, 89, 90.
Stockholm, 409, 410.
Stock industry, Australasia, **294, 295;** S. America, 270, 281; U. S., 134, **155, 156, 171–174;** western stock ranges (Fig. 105), 172; see also **Live stock.**
Stockton, 189, 191.
Stoke-upon-Trent, 403.
Stone, 91; precious, **95,** 188.
Stonehenge, 91.
Stourbridge, 10.
Strasbourg, 425.
Structural material, 91, 92.
Struma, 370.
Sturgeon, 151, 333, 433.
Stuttgart, 424.
Suakin, 349.
Subsidies, government, 44.
Substitution, influence of, **54, 55.**
Subways, and tunnels in N.Y. (Fig. 77), 127.
Sudân, 34, 348, **352,** 355.
Sudbury, 247.
Suez Canal, 6, 8, 13, 28, 73, 74, 167, 240, 241, 250, 298, 332, 337, 348, **349,** 358, 366, 374, 396, 404.
Sugar, 89, 441, 442; industry of the world (Fig. 278), 442; **beet, 51, 54, 55, 441, 442;** Belgium, 413; Bohemia, 382; California, 181, 190, 442; Zechoslovakia, 442; Denmark, 411; Europe, 236, 263; France, 392, 442; Germany, 89, 420, 421, 442; Holland, 413; Iberian Peninsula, 377; Italy, 372; Michigan, 154; New York, 114, 154; Russia, 431, 433, 442; U. S., 201, 442; Wisconsin, 154; **cane,** 35, 55, **441, 442;** Africa, 356; Argentina, 282; Australia, 296; Barbados, 264; Central America, 256; China, 313; Cuba, 89, 201, **236,** 237, 263, 442; Egypt, 346; Fiji, 293; Haiti, 265; Hawaii, 190, 218, 219, 442, gathering sugar cane (Fig. 150), 218; India, 89, 442; Indian Ocean, Islands of, 359; Java, 324, 442; Louisiana 131, **139;** Philippines, 225, 227, 228; Porto Rico, 232, 442; S. America, 274, 442; Taiwan, 303; Trinidad, 264; Virginia, 105; U. S., 442; West Indies, 262, 266, 392; field of, with central mill in Cuba (Fig. 165), 236; exports of, Austria, Hungary, Belgium, Cuba, Dutch E. Indies, France, Germany, S. America (Fig. 278), 442; **refining,** 114, 143, 189, 284, 383, 402.
Sulphur, China, 315; Iberian Peninsula, 378; Italy, 143; Japan, 304; Louisiana, 143; Mexico, 258; Sicily, 373; production of the world (Fig. 90), 143.
Sulphuric acid, 55.
Sultanabad, 333.

Sulu, 228; **Sea,** 224.
Sumac, 199, 371.
Sumatra, 324, 325.
Sungari River, 314.
Sunshine, possible hours of, map (Fig. 171), 244.
Superior, 27, 157, 168, 252; **Lake,** 100, 121, 161, 167, 252; iron and copper district, 161, 163, 247, 249, map (Fig. 99), 161.
Surabaya, 325.
Suram Tunnel, 435.
Susitna Valley, 212, 216.
Susquehanna River, 99, 112, 127, 128, 129.
Swansea, 403.
Swatow, 318.
Sweden, 12, 389, **407,** 409–412; map (Fig. 258), 408; see also **Scandinavian Peninsula.**
Sweet potatoes, 86.
Swine, Austria and Hungary, 81; Balkan Peninsula, 81; China, 314; Denmark, 81; France, 81, 391; Germany, 81, 420; Iberian Peninsula, 377; Rumania, 381; Russia, 81; Serbia, 367; S. America, 81; U. S. 81, 133, 156, 199.
Switzerland, 90, **386–389,** 413; commerce, **389;** exports, 80, 387 (Fig. 252), 389; government, **386;** manufactures, **388;** map (Fig. 250), 386; natural resources, **386–388;** "playground of Europe," 387; population, 450, 451; railway mileage, 452; surface, **386;** trade routes, 374, 385, 389.
Sycamore, 133.
Sydney [Australia], 221, 241, 293, 295, **298;** [N. S.], 249.
Syra, 366.
Syracuse, 122, 123, 129.
Syria, 7, 340, 342, 350; map (Fig. 228), 338.
Syrup, 89, 159.

Tabriz, 333.
Tacoma, 189, 190, 195.
Tagus River, 377, 379.
Tahiti, **292,** 293.
Taiwan (Formosa), 301, 304, 306, **307,** 318; products, 303, 312.
Tamatave, 359.
Tampa, 144, 149.
Tampico, **259,** 260.
Tampico, or ixtle, fiber, 257.
Tanana Valley, 214, 215.
Tanganyika, Lake, 354.
Tangier, 351.
Tanjong Priok, 325.
Tanning industry, **116,** 144, 160.
Tapioca, 86, 273, 325.
Tar, 133.
Taro, 86, 218.
Tasajo, 284.
Tashkent, 436.
Tasmania, 293, 294, 296, **298.**
Tate, 142.
Tauern, 385.
Taunton, 117.
Taxation, reform needed, 200; system of, **44.**
Tea, 34, 35, 53, **442, 443;** Africa, 356; Ceylon, 312, 314, 329, 330, 443; China, 89, 312, 313, 314, 320, 321, 329, 443; India, 312, 329, 332, 443; Indo-China, 326; Iranian Plateau, 334; Japan, 303, 307, 312, 324, 329, 443; Russia, 433; Taiwan, 303, 312, 329; U. S., 142; the principal consumers, 443; exports, sources of (Fig. 222), 329; gathering, near Kyoto (Fig. 205), 304; picking, at Summerville (Fig. 88), 141; transportation of, 317.
Teak, 281; Burma, 329; elephants hauling logs in Burma (Fig. 221), 328; Indo-China, **326.**
Tehran, 343.
Tehuantepec, 254, 260.
Telegraph, the, **62,** cable and postal routes, map (Fig. 52), facing 98.
Telephone, the, **62, 63,** 389.
Temperature belts, in U. S. (Fig. 56), **101;** of the world (Fig. 16), facing 30.
Tennessee River, 147; **Water Gap,** **149.**
Terneuzen Canal, 415.
Terni, 373.
Terra-cotta, 123.
Terre Haute, 160.
Tete, 357.
Teutonic nations, 363.
Textile fibers, production and value of leading (Fig. 46), 90.
Textile industry, Austria, 383; Czechoslovakia, 383; France, 394; Great Britain, **401, 402;** Japan, 307; Mexico, 259; Russia, 434; Spain, 378; U. S., 117, 118, **206.**
Thames River, 404.
Thessaly, 365, 366.
Thracian Plain, 368.
Tibesti, 352.
Tibet, 311, 314, 331.
Tientsin-fu, 317–319.
Tiflis, 434, 435.
Tigris River, 5, 6, 332, 334, 335, 338, **343.**
Tilbury Docks, 404.
Tile, 92; **tiling,** art, 165.
Tillers of the soil, trade among, **3, 5.**
Timber, mfg., Canada, 202; Porto Rico, 232; Rumania, 369; Russia, 438; Scandinavian Peninsula, 408, 409; U.S., **157, 158,** 197, 198, 202; raft on Columbia ready for towing (Fig. 123), 190; see also **Forests,** under countries.
Timbuktu, 352.
Time belts, **46;** map (Fig. 23), 46.
Timor, 324.
Tin, 7, 11, 93, **95;** Alaska, 212; Australia, 296, 325; Banka, 325; Billiton, 325; Bolivia, 275, 325; China, 315; Dutch East Indies, 325; Great Britain, 400, 403; Malay Peninsula, 296, 325; world's production of (Fig. 219), 325.
Tinian, 291.
Tirol (Trentino), 382.
Tobacco, 36, 51, 54; Africa, 351; America, 89; Austria and Hungary, 136, 382; Belgium, 413; Brazil, 136; Bulgaria, 367; Canada, 246; China, 313; Chosen, 308; Cuba, 136, **236;** Dutch East Indies, 136; France, 392; Greece, 365; Germany, 421; Haiti, 265; Hawaii, 218, 219; Italy, 373; Japan, 303, 305; Latakia, 340; Mexico, 257; Missouri, 154; New Caledonia, 293; Ohio, 154; Paraguay, 282; Philippines, 225, 227, 228; Porto Rico, 231–233; Russia, 136, 432; Samsun, 340; S. America, 274, 275; Sudân, 352; Sumatra, 324; Turkey, 136, 340, 368; U. S., 114, 130, **134–136,** 197, 200; yield of, per square mile (Fig. 82), 135; Virginia, 105, 139, 197; Wisconsin, 154; industry of the world

(Fig. 83), 136; manufacture in Austria and Hungary, 383; Cuba, 144, 237; Russia, 433; Spain, 378; U. S., 114, 115, 144; market, principal, 427.
Tokyo, 303, 306, 307, 309.
Toledo, 159, 160, 164, 166.
Tolu, 271.
Tongking, 326.
Tonka beans, 271.
Tons and tonnage, xiii.
Topaz, 188.
Topeka, 159.
Topolobampo, 260.
Toronto, 169, 249, 251.
Tortoise shells, 79, 292, 325.
Tortosa, 379.
Toulon, 396.
Toulouse, 392, 395.
Tourmaline, Brazil, 275; California, 188.
Toys, mfg., 422, 424.
Trade, among savage tribes, **1**; among hunters and fishers, **2**; among shepherds, **2, 3**; among tillers of the soil, **3, 5**; domestic, beginning of, 2; domestic, flourished, 5; left to subject peoples, 9; routes to the Orient, ancient and mediæval, map (Fig. 3), facing 10; routes to the north from the Mediterranean, mediæval, map (Fig. 4), facing 11; routes, shifting of, **12, 13**; make and unmake cities, 13; routes to East blocked by Turks ended Mediterranean and introduced Oceanic Age of commerce, 13; in Asia and Africa, 41; see also **Trade routes** under countries.
Trails, the first overland, **106, 107.**
Transcaucasia, 432, 433, 434, 435.
Transportation, how lowlands affect, **18**; upland valleys affect, **19, 20**; mountains affect, **20**; the development of, **59–77**; influence of, **59**; communication by messengers, **59–60**; the post, **60, 61**; use of signals (Fig. 26), **61**; telegraph, **62**; telephone, **62, 63**; tests of, **63**; methods of, **63, 64**; human porterage, **64**; transportation by man power (Fig. 27), 65; pack animals, **65**; wheeled transportation, **66**; in the desert, 65; modern "ship of the desert" (Fig. 28), **66**; the old way (Fig. 29), 66; construction of roads, **67**; mud road and same road macadamized (Fig. 30), 68; the railroad, **69, 70**; fifteen years' development in locomotives (Fig. 31), 69; trolley lines in the Middle West (Fig. 32), 70; modern progress in transportation (Fig. 33), 71; pipe lines, **70, 72**; inland navigation, **72, 73**; ship canals, **73, 74**; ocean navigation, **74–76**; modern steel sailing ship (Fig. 35), 75; old and new in ocean steamships (Fig. 36), 76; how transportation rates are fixed, **76, 77**; good transportation essential for unification of a country, 108; as a factor in international commerce, **452–454**; in China, 316, 317; on Mississippi and Ohio Rivers, 165, 166; rail and inland water in Austria-Hungary, Belgium, Canada, France, Germany, Great Britain, Russia, United States, xviii, xix; see also under countries.
Transvaal, 356, 357.
Transylvania, 369, 381.
Treaties, reciprocity, of 1866, 253; of 1903, 238.
Trebizond, 334, 343.
Trejevna Pass, 370.
Trenton, 27, 118, 122, 123, 165.
Trentino, 382.
Trepang, Australia, 294; Malaysia, 325; Oceania, 292.
Tres Cruces Pass, 285.
Trieste, 28, 374, 375, **385.**
Trinidad, 263, 264, 272.
Tripoli, 351.
Tripolitania, 349.
Trolley car, which made speed of 130 miles an hour (Fig. 270), 425; lines in Middle West (Fig. 32), 70.
Tromsö, 411.
Trondhjem, 411.
Trout, lake, 245.
Troy, 115, 118, 129.
Troyes, 10.
Truckee-Carson project (Fig. 109), 176.
Truffles, 392.
Tsinan-fu, 322.
Tsingtao (or Chingtao), 322.
Tucacas, 278.
Tucuman, 282.
Tulu, 434; coal fields, 433, 434.
Tungsten, 185.
Tunis, 351.
Tunisia, 349, 350, 351.
Tunny fish, 351, 373, 378.
Turin, 27, 373, 374, 395.
Turkestan, 311, 432, 436.
Turkey, 6, 60, 335, 336, 362, 367, 368, 385; -in-Asia, **337–341**; commerce, 341; exports, 339, 341; products, 312, 339, 340, 341; irrigation, need of, **339, 340**; manufactures, 341; mineral resources, 341; -in-Europe, **368–369**; commerce, **368**; exports, 368; resources, **368.**
Turkish rugs, 341, 368.
Turks, 12, 363; conquests, effects of, 13.
Turpentine, 84, 133, 198, 199, 302; and rosin, sources of, entering international commerce (Fig. 79), 132; orcharding, new methods of (Fig. 80), 133.
Turquoise, Arizona, 188; New Mexico, 188; Nishapur, 333.
Turtles, 133.
Tuscany, 373.
Tutuila, 221; (Fig. 11), 25.
Tuxpam, 258, 259.
Twentieth Century Limited (Fig. 33*a*), 71.
Tyre, 6, 7, 8, 342.

Uea (Wallis) **Island,** 292.
Ukrainia, 432.
Ulm, 425.
Union, Bonds of, 107, 108.
Union of South Africa, commerce of (Fig. 237), 358.
Union Pacific, driving last spike on, 108.
United States, 37, 240, 275, 389; making of the, **98–108**; physical divisions, map (Fig. 54), facing 99; relation of physiography to population (Fig. 55), 99; coastal plain and Appalachian Highland, **99, 100**; Central Plain, **100**; Cordilleran Highland, **100, 101**; climate, **101, 102**; temperature belts (Fig. 56), 101; mean annual rainfall (Fig. 57), 103; people, **103, 104**; density of population, map

(Fig. 58), 104; northern and southern types of agriculture, **105, 106;** early importance of water ways, **106;** inland water ways, map (Fig. 62), facing 109; first overland trails, **106, 107;** early highways to the West (Fig. 59), 107; bonds of union, **107, 108;** map (Fig. 61), between 108, 109; areas originally wooded and National Forest Reserves, map (Fig. 60), facing 108; continental U. S., by sections (Fig. 64), 111; **North Atlantic Section, 109–129;** climate and surface, **109;** soil, **109, 110;** glacial soils, map (Fig. 63), 110; early industries, **110, 111;** fisheries, **111, 112;** American fishing banks in Atlantic, map (Fig. 65), 112; forest products, **112, 113;** farming, **113, 114;** distribution of hay (Fig. 66), 113; industries using farm products, **114, 115;** why manufactures flourish, **115, 116;** mechanical power used in manufactures (Fig. 67), 115; long distance transmission of electric power from Niagara Falls (Fig. 68), 116; water power at Niagara (Fig. 69), 117; leather manufactures, **116, 117;** textile manufactures, 117, 118; mineral industries, **118, 119;** mineral fuels, 95, **119, 120;** coal fields (Fig. 70), 120; oil and gas fields (Fig. 71), 121; iron, industry, **120–122;** steel works at Pittsburgh (Fig. 72), 121; other mineral industries, **122–123;** portland cement (Fig. 73), 123; seaports, **123–127;** Boston Harbor (Fig. 74), 124; percentage of foreign commerce handled by leading seaports (Fig. 75), 125; New York Harbor (Fig. 76), 126; canals, **127, 128;** subways and tunnels, N. Y., (Fig. 77), 127; railway routes to the West, **128, 129;** **Southern Section, 130–149;** Southern people, **130;** surface and soil, **130, 131;** southern climate, **131, 132;** forest and fishery products, **132, 133;** sources of turpentine and rosin entering international commerce (Fig. 79), 132; new method of turpentine orcharding (Fig. 80), 133; live stock in the South, **133, 134;** Texas cattle (Fig. 81), 134; tobacco belt, **134–136;** distribution of crop (Fig. 82), 135; tobacco industry of the world (Fig. 83), 136; cotton belt, 90, **136, 137;** raw cotton and cottonseed oil (Fig. 84), 136; distribution of cotton crop (Fig. 85), 137; picking cotton (Fig. 86), 138; destination of U. S. cotton crop (Fig. 91), 144; export of cotton goods per spindle (Fig. 251), 387; cotton manufactures, **444, 445** (Fig. 279), **444;** rice and sugar belt, **139;** finished rice threshing (Fig. 87), 139; sugar industry of the world, **441, 442** (Fig. 278), 442; other Southern crops, **140–142;** picking tea (Fig. 88), 141; mineral products, **142, 143;** phosphate-rock production (Fig. 89), 142; sulphur production (Fig. 90), 143; Alabama coal and iron region (Fig. 92), 145; manufactures, **143–145;** commercial centers, **145–149;** New Orleans Harbor (Fig. 93), 147; **North Central section, 150–169;** people, **150;** climate, **150;** soil, 150–151; furs and fish, 151; forests, **151, 153;** grain, **153, 154;** yield of (Fig. 96), 153; evolution of grain harvesting (Fig. 95), 152; other crops, **154, 155;** flax-seed crop (Fig. 97), 154; stock raising, **155, 156;** dairy products, **156;** manufactures, **156–158;** westward migration of centers of population, agriculture, and manufactures (Fig. 98), 157; meat packing, **158, 159;** grain products, **159;** other manufactures, 160; mineral fuels, **160;** lead and zinc, **161;** gold and copper, **161, 163;** Lake Superior iron and copper districts (Fig. 99), 161; iron ore, **163;** modern method of handling Lake Superior iron ore (Figs, 100, 101), 162, 163; manufactures of iron and steel, **164;** other mineral products, **165;** water ways, **165–167;** fleet of barges carrying coal down the Ohio (Fig. 102), 166; commercial centers, **167–169;** Sault Ste. Marie Canal (Fig. 103), 168; **Western section, 170–195;** "Winning of the West," **170;** "Land of little rain," **170;** Pacific Slope, **171;** stock raising, **171–174;** artesian well (Fig. 104), 171; western stock ranges (Fig. 105), 172; grazing industry (Fig. 106), 173; other animal industries, **174;** forests, **174, 175;** flume for conveying timber out of the mountains (Fig. 107), 174; fisheries, **175, 177;** irrigation, **177, 179;** irrigated areas (Fig. 108), 175; opening of first irrigation canal, Truckee-Carson project (Fig. 109), 176; irrigating a field (Fig. 110), 177; picking raisin grapes (Fig. 111), 178; relief map of lower Colorado Valley (Fig. 112), 180; irrigated hop yard (Fig. 116), 183; dry farming, **179, 180;** dry land areas (Fig. 113), 181; districts producing durum wheat (Fig. 114), 181; agricultural products, **181, 183;** farming by steam (Fig. 115), 182; fruit industry in California (Fig. 117), 184; young date orchard (Fig. 118), 185; mineral products, **183, 185, 188;** location of principal mineral deposits (Fig. 119), 186; modern gold dredge at work (Fig. 120), 187; oil wells and derricks (Fig. 121), 188; salt piles in Salton Sink (Fig. 122), 189; manufactures, **188–190;** timber raft on the Columbia (Fig. 123), 190; transportation facilities, **191, 192;** early highways to the Pacific (Fig. 124), 191; inland commercial centers, **192;** sacked wheat at Waterville, Wash. (Fig. 125), 192; seaports, **193–195;** artificial harbor at San Pedro (Fig. 126), 194; **United States in the markets of the world, 196–209;** foundations of commerce, **196;** density of railways (Fig. 127), facing 196; staple products, **196, 197;** map of areas producing commercial staples (Fig. 128), between 196, 197; foreign commerce (Fig. 130), 197; fish and furs, **197, 198;** fishing industry (Fig. 131), 198; forest products, **199;** lumber industry (Fig. 132), 198; live stock products; **199, 200;** crop products, **200, 201;** value of all crops (Fig. 133), 199; agricultural industry (Fig. 134) 200; exports (Fig. 130), 197; fishing (Fig. 131), 198; lumber (Fig

132), 198; farm products (Fig. 134), 200; crude minerals (Fig. 139), 204; manufactures (Fig. 142), 206; (Fig. 286), 450; growth of export trade in (Fig. 141), 206; wood (Fig. 259), 409; wheat and flour (Fig. 277), 441; cotton goods (Fig. 279), 444; wool (Fig. 280), 445; machinery (Fig. 285), 449; import of tropical and subtropical products (Fig. 135), 201; imports (Fig. 130), 197; fish and furs, 197, 198; forest products, 199; of animal origin, 200; crop products, 201; commerce with foreign countries and non-contiguous territory by classes of commodities, **xx**; growth of population (Fig. 136), 201; population of principal commercial countries (Fig. 287), 450; occupations of people (Fig. 288), 451; why agricultural exports must eventually decline, **201, 202**; mineral products, **202–204**; value of minerals raised (Fig. 137), 202; world production of minerals (Fig. 138), 203; mineral industry of U. S. (Fig. 139), 204; iron industry of the world (Fig. 282), 447; annual production of pig iron (Fig. 284), 449; manufactured products, **204, 205**; rank of nations in manufactures, **448–452**; proportional value and density of manufactures (Fig. 140), 205; manufacturing industries (Fig. 142), 206; growth of export trade (Fig. 141), 206; exports of manufactures (Fig. 286), 450; why foreign markets are necessary, **205, 206**; where they may be found, **206, 207**; trade with Canada, 288; trade with S. America, 288–290; relations with China, 321; with Cuba, **234**; with Haiti and Dominican Republic, 265; merchant vessels, 454; tonnage of merchant marine (Fig. 261), 410; sea-going tonnage (Fig. 292), 454; railway mileage, 452, 453; rail and inland water transportation, xviii; conservation of natural resources, **207–209**; purchase of Danish West Indies, 242, 266, 412; expansion in the Pacific, **210–228**; expansion in the Caribbean, **229–242**; see also under names of products.

Ural Mountains, 430, 433, 435.
Urga, 318, 319, 323.
Uruguay, 270, 281, 283–286; **River,** 286.
Uspallata Pass, 285.
Utica, 118, 129.
Uyuni, 285.

Valdai Plateau, 434.
Valdez, 215.
Valdivia, 280, 284, 285.
Valencia, 278, 377, 378, 379.
Valenza, 374.
Valparaiso, 285, 287.
Vancouver, 249, 252.
Vanilla, 88, 89; Central America, 256; Hawaii, 218; Indian Ocean, Islands of, 359; Philippines, 226; Tahiti, 293.
Van Reenens Pass, 357.
Vardar Valley, 367, 369.
Varna, 370.
Vaseline, 96.
Vegetation belts of the world, natural (Fig. 17), facing 31.
Venezuela, 34, 269, 272, 275.
Venice, 12, 26, 371, 374, **375**; leading commercial city of the world, 11; school of commerce at, 373.
Vera Cruz, 254, 256, **259**.
Vermillion, 163.
Verviers, 413, 414.
Victoria, 295, 297; **Falls,** 356, 357; **Lake,** 354.
Vicuña, 83, 270.
Vienna, 27, 374, 379, 383, **384**, 385, 395, 396, 426.
Vieques (Crab) **Island,** 23.
Virgin Islands, 266, xiv, xviii.
Vistula River, 425, 426, 434, **84**.
Vladivostok, 314, 318, 426, 438; the terminus of the great Trans-Siberian Railway (Fig. 274), 436.
Vodena, 365.
Volga River, 432, 433, 434, 435, 437.
Volos, 366.
Vosges Mountains, 394, 395, 426.
Vuelta Abajo, tobacco, 236.

Wabash River, 106.
Waco, 143.
Wady Halfa, see Halfa.
Wakamatsu, 305.
Wales, 363, 400, 401; see also **Great Britain.**
Walnut, 85, 133, 183, 372, 392.
Walrus, 79, 81.
Waltham, 119.
Wankies Field, 356.
Warnemünde, 412.
War of 1812, effects of, 110.
Warsaw, 433, 434, 435.
Warwick, 117.
Washington [D. C.], 38, 146, 210.
Watches, France, 394; Switzerland, 388; U. S., 119, 164.
Water buffaloes, 226.
Waterbury, 119.
Water gaps, 19, 20, 100.
Waterloo, 413.
Water power, how forests affect, **22**; in N. Atlantic section, 115–117; S. America, 276; Switzerland, 388; U. S., 190.
Water routes, termini of inland, **27**.
Watertown, 112, 115.
Water ways, early importance of, 106; Canada, 249–251; Germany, 426; Netherlands, **414, 415**; Russia, **434, 435**; U. S., 165, 167; inland, map (Fig. 62), facing 109; mileage in Austria-Hungary, Belgium, Canada, France, Germany, Great Britain, Russia, United States, xviii.
Wattle, black, 356.
Wax tree, 302; works, 259.
Wayne, Fort, 106, 164.
Weather Map (Fig. 21*a*), facing 36.
Weaving, 7.
Weeds, 85.
Weights, measures, grading, 44, 45, xiii.
Weihaiwei, 323.
Welland Canal, 167, 250.
Wellington, 298.
Weser River, 405, 426, 427.
West Indies, 86, 149, 229, 238, **262–267**, 270, 272, 392; climate and surface, **262**; inhabitants, **262**; British, 263; principal ports of, **264**; Danish, 242, **266**, 412; Dutch, 242, **266, 267**; French, **266**; map (Fig. 194), facing 290.

Westphalia, 420.
Whalebone, 79.
Whale oil, 55, 79.
Wheat, 34, 87, **88,** 89, **440, 441;** average yield of, per acre (Fig. 276), 440; Africa, 351; Alaska, 214; Argentina, 285, 441; Australia, 299; Austria, 382, 440; Bulgaria, 367; Canada, 246, 247, 252, 441, miles of wheat in (Fig. 172), 246; Central America, 256; Ceylon, 330; China, 314; Egypt, 346; France, 87, 392, 440; Germany, 421, 440; Great Britain, 399, 440, 441; Greece, 365; Hungary, 382, 440; Iberian Peninsula, 377; India, 87, 330, 332, 441; Iranian Plateau, 333; Italy, 87, 371, 372; Japan, 303; Manchuria, 314; Mesopotamia, 341; Mongolia, 314; Rumania, 369, 441; Russia, 87, 392, 431, **432,** 440, 441; S. America, 87, 273, 282, 286; Syria, 340; Turkey, 341, 368; U. S., 15, 51, 52, 59, 87, 113, 140, 144, 150, 154, 159, 170, 174, 181, 189, 200, 201, 202, 314, 440, 441; durum, 179, 373, districts producing (Fig. 114), 181; elevator in Buenos Aires (Fig. 191), 287; and flour, export of (Fig. 277), 441; sacked, at Waterville, Wash. (Fig. 125), 192; world crop (Fig. 43), 87.
Wheeling, 122, 145.
Whisky, 88, 90, 402.
Whitefish, 151, 245.
Whiting, 160.
Wichita, 159.
Wilderness Road, Boones, 107.
"Wild Rose" Pass, 369.
Wilkes-Barre, 119.
Willamette River, 101, 174, 191.
William, Fort, 250, 251.
Williamsport, 112.
Wilmington, 147; [Del.], 116, 122; [N. C.], 143; **Harbor** [Cal.], 193.
Wilton carpets, 402.
Windmill, and reservoir for watering cattle on high plains (Fig. 106*a*), 172.
Winds, relation of, to commerce, **31, 32;** cause of, **32;** prevailing winds and climatic belts, **32, 33;** prevailing surface winds of the world (Fig. 19), 33; seasonal migration of (Fig. 20), 34; brave west, 36; horse latitudes, 32; monsoon, 35; prevailing westerlies, 32; trade, 32, **34, 35,** 36; cause of trade (Fig. 18), 32.
Wine, 8, 85, 90; France, 396; Greece, 365; Hungary (Tokay), 382; Iberian Peninsula, 377; Italy, 372, 375; Madeira Islands, 358; Portugal, 379; Spain, 379.
Winnipeg, 250, 252; **Lake,** 100, 246, 252.
Winona, 157.
Winston-Salem, 144, 145.
Wisconsin River, 106, 166.
Woburn, 116.
Wŏnsan (Gensan), 309.
Wood, carved and inlaid, 315, 388; exports (Fig. 259), 409; oil, 312; pulp, 112, 157, 199, 383, (Fig. 260), 409.
Wool, 18, 59, **83,** 124, 200, **445, 446;** production and value, 90; industry of the world (Fig. 280), 445; in Africa, 83, 358, 445; Argentina, 83, 394, 445; Asia, 315, 445; Australasia, 83, 295, 298, 299, 445; Ceylon, 329; Great Britain, 401, 445; India, 329; Iranian Plateau, 332; Michigan and Ohio, 155; Russia, 445; S. America, 270, 287; Spain, 377; Turkey, 339; U. S., 83, 172, 445; **manufactures,** Austria, Hungary, 383, 445; Belgium, 11, 414; Bulgaria, 368; Czechoslovakia, 383; France, 394, 445, 446; Germany, 423, 424, 445, 446; Great Britain, 401, 402, 445, 446; Italy, 11, 373; Russia, 434; Scotland, 402; S. America, 284; Sweden, 409; United States, 117, 118, 190, 445, 446.
Woonsocket, 117.
Worcester [Eng.], 403; [Mass.], 119.
World, faces the Atlantic, **13;** the creation of steam and electricity, 14; "world of the great forest," **353, 354;** world industry and commerce, **440–455;** commerce, two currents of, **454–455.**
World War, 292, 294, 320, 367, 368, 370, 376, 381, 393, 412, 420, 427, 429, 430, 449.
Wusung, 319.

Yak, 315.
Yalu River, 308, 312.
Yams, 86.
Yangtse Kiang, 311, 317, 318, 319.
Yanina (ancient Dodona), 367.
Yap, 222, 293.
Yarmuk Valley, 342.
Yenisei, 435.
Yezo (Hokkaido), 301, 302, 304.
Yingtse, 320.
Yinkow, 320.
Ylang-ylang, 225.
Yogo Gulch, 188.
Yokohama, 250, 306, 307
Yonkers, 126.
York, 115.
Youngstown, 122, 164.
Yucatan, 254, 257, 259.
Yugoslavia, 367, 381, 383, 385.
Yukon, 212; **River,** 101, 210–216, **249.**
Yŭnnan, 315, 317, 322, 327.

Zab Ala, 342.
Zacatecas, 258.
Zagreb, 385.
Zambezi River, 337, 356, **357.**
Zamboanga, 228.
Zanesville, 165.
Zanzibar, 344, 354.
Zebra, 356.
Zinc, 93, **95;** Africa, 351, 356; Australia, 296; Belgium, 203, 414; France, 393; Germany, 203, 421; Great Britain, 203, 403; Greece, **365;** Iberian Peninsula, 378; Luxembourg, 429; Mexico, 258; Russia, 433; Sardinia and Elba, 373; Sweden, 409; U. S., **161,** 203, 204; Wales, 400; Yugoslavia, 383;
Zittau, 424.
Zones, climatic, 33; equatorial, **33, 34;** Frigid, **37;** life, in N. A. (Fig. 78), 131; sub-equatorial, **34;** sub-tropical, **35, 36;** Temperate, **36, 37,** 38; Tropical, **34, 35.**
Zŭrich, 374, 388, 389; Federal Polytechnicum at, 388.
Zwickau, 424.

ADDENDA

Alsace, oil wells and potash deposits, 459; map (Fig. 294), facing 458.
Angora, 461.
Argentina, trade during World War, 464.
Armenia, Turkish, 461.
Austria, republic of, 461; map (Fig. 296), facing 459.
Austria-Hungary, 461; dismemberment of the empire, 461; map (Fig. 296), facing 459; and its peoples, map (Fig. 297).
Austrian Tyrol, 461.

Baltic republics, 464; map (Fig. 298), facing 461.
Belgium, increase of territory, 459, 460; map (Fig. 294), facing 458.
Bosnia, 461.
Bulgaria, map (Fig. 296), facing, 459.

Constantinople, 461, 463.
Croatia, 461.
Cyprus, 461.
Czechoslovakia, republic of, 461; map (Fig. 296), facing 459.

Dalmatia, 461.
Danzig, free city of, 460; map (Fig. 297), facing 460.
Debts of Allied countries, 464, 465.
Denmark, increase of territory, 460.

Egypt, 461.
Estonia, republic of, 463, 464; map (Fig. 298), facing 461.
Europe in 1922, map (Fig. 295), between 458 and 459.

Finland, republic of, 463, 464; map (Fig. 298), facing 461; area and population, 464; forests, 464.
France, restoration of Alsace and Lorraine, 459; coal mines, 459; map (Fig. 294), facing 458; iron ore resources, 459; public works, 466.

Galicia, 461.
German East Africa, 459.
Germany, per capita debt of, 465; map (Fig. 295), between 458 and 459; currency of, 469.
Great Britain, per capita debt of, 465; financial condition, 465.
Greece, 461, 463.

Hejaz, 461.
Hungary, republic of, 461; map (Fig. 296), facing 459;

Iraq, 461, 463.
Istrian Peninsula, 461.
Italy, 461; public works, 466.

Kiel Canal, 460.
Kurdistan, Turkish, 461.

Latvia, republic of, 463, 464; map (Fig. 298), facing 461.
Lithuania, republic of, 460, 463, 464; map (Fig. 298), facing 461.
Lorraine, commercial advantages of, to France, 459; iron ore resources, 459; map (Fig. 294), facing 458.

Mesopotamia, 461.
Middle Europe power, the great, 459; map (Fig. 293), 457.
Mosul, sovereignty over, 463.

Palestine mandate, 461.
Poland, republic of, 460–461; map (Fig. 297), facing 460; acquired Galicia, 461.
Political changes due to World War, 458–464.

Rhine frontier, the, map (Fig. 294), facing 458.
Rumania, 461; map (Fig. 296), facing, 459.
Russia, 463; currency of, 465, 466; map (Fig. 298), facing, 461.
Russia and Turkey, pre-war, and the states formed from them, map (Fig. 298), facing, 461.

Saar Basin, coal mines of, 459; map (Fig. 294), facing, 458.
Serbia, 461.
Serbs, Croats and Slovenes, Kingdom of the, 461; map (Fig. 296), facing, 459.
Slavonia, 461.
Smyrna, 461, 463.
Syria, 461.

Tanganyika Territory, 459.
Thrace, 463.
Transylvania, 461.
Treaties at close of war, principal, 457.
Trieste, 461.
Turkey, 461, 463.
Turkey, pre-war, and states formed from it, map (Fig. 298), facing 461.
Tyrol, Austrian, 461.

United States, per capita debt of, 465; gold in, at close of World War, 465.

Vilna, disposition of, 460.

War, effects of, 456, 458.
World War, 456, 458; political changes due to, 458–464; effects of, on commerce, 464–466.

Yugoslavia, *see* Serb-Croat-Slovene Kingdom.

X5

North Atlantic

Maine
New Hampshire
Vermont
Massachusetts
Rhode is.
Connecticut

Middle Atlantic

New York
New Jersey
Pennsylvania
Delaware
Maryland
Virginia
West Virginia
Dist. of Columbia

Southern State

North Carolina
South " "
Georgia
Florida
Alabama
Mississippi
Louisiana
Texas
Arkansas
Tennessee
Oklahoma

Central ~~State~~

Kentucky
Ohio
Indiana
Illinois
Missouri
Kansas
Iowa
Nebraska
Michigan
Wisconsin
North Dakota
South
Minnesota

Pacific States

Colorado
Montana
Wyoming
Nevada
Idaho
Utah
California
Oregon
Washington

Nitrogen [illegible] Northern Chile

Phosphorus - South

Potassium - Stassfurt, Germany.

with Copper, Aluminum + Manganese
to form other bronze.

Textile

woolen - Lawrence, Mass.

Cotton

Southern Section

900,000 area sq. mile

(40) 37,000,000 Population

40 per. sq. mile, Less than
(5 times smaller) Northern.